

Version 7.05.300

NN46110-318 02.01

322831-B Rev 01

November 2007

Standard

600 Technology Park Drive
Billerica, MA 01821-4130

Nortel VPN Router Installation — VPN Router 2750



Copyright © 2007 Nortel Networks. All Rights Reserved.

The information in this document is subject to change without notice. The statements, configurations, technical data, and recommendations in this document are believed to be accurate and reliable, but are presented without express or implied warranty. Users must take full responsibility for their applications of any products specified in this document. The information in this document is proprietary to Nortel Networks Inc.

Trademarks

Nortel, the Nortel logo, and the Globemark are trademarks of Nortel Networks.

Adobe and Acrobat Reader are trademarks of Adobe Systems Incorporated.

HyperTerminal is a trademark of Hilgraeve, Inc.

Intel is a trademark of Intel Corporation.

Microsoft, Windows, and Windows NT are trademarks of Microsoft Corporation.

Netscape and Netscape Navigator are trademarks of Netscape Communications Corporation.

All other trademarks are the property of their respective owners.

Statement of conditions

In the interest of improving internal design, operational function, and/or reliability, Nortel Networks Inc. reserves the right to make changes to the products described in this document without notice.

Nortel Networks Inc. does not assume any liability that may occur due to the use or application of the product(s) or circuit layout(s) described herein.

USA requirements only

Federal Communications Commission (FCC) Compliance Notice: Radio Frequency Notice

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy. If it is not installed and used in accordance with the instruction manual, it may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case users will be required to take whatever measures may be necessary to correct the interference at their own expense.

European requirements only

EN 55 022 statement

This is to certify that the Nortel Networks VPN Router 2750 is shielded against the generation of radio interference in accordance with the application of Council Directive 89/336/EEC, Article 4a. Conformity is declared by the application of EN 55 022 Class A (CISPR 22).

Warning: This is a Class A product. In a domestic environment, this product may cause radio interference, in which case, the user may be required to take appropriate measures.

Achtung: Dieses ist ein Gerät der Funkstörgrenzwertklasse A. In Wohnbereichen können bei Betrieb dieses Gerätes Rundfunkstörungen auftreten, in welchen Fällen der Benutzer für entsprechende Gegenmaßnahmen verantwortlich ist.

Attention: Ceci est un produit de Classe A. Dans un environnement domestique, ce produit risque de créer des interférences radioélectriques, il appartiendra alors à l'utilisateur de prendre les mesures spécifiques appropriées.

EC Declaration of Conformity

This product conforms (or these products conform) to the provisions of the R&TTE Directive 1999/5/EC.

Japan/Nippon requirements only

Denan statement



警告

本製品を安全にご使用頂くため、以下のことにご注意ください。

- 接続ケーブル、電源コード、ACアダプタなどの部品は、必ず製品に同梱されており添付品または指定品をご使用ください。添付品・指定品以外の部品をご使用になると故障や動作不良、火災の原因となることがあります。
- 同梱されております付属の電源コードを他の機器には使用しないでください。上記注意事項を守らないと、死亡や大怪我など人身事故の原因となることがあります。

Voluntary Control Council for Interference (VCCI) statement

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラス A 情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

Taiwan requirements

Bureau of Standards, Metrology and Inspection (BSMI) statement

警告使用者:

這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

Canada requirements only

Canadian Department of Communications Radio Interference Regulations

This digital apparatus (VPN Router 2750) does not exceed the Class A limits for radio-noise emissions from digital apparatus as set out in the Radio Interference Regulations of the Canadian Department of Communications.

Règlement sur le brouillage radioélectrique du ministère des Communications

Cet appareil numérique (VPN Router 2750) respecte les limites de bruits radioélectriques visant les appareils numériques de classe A prescrites dans le Règlement sur le brouillage radioélectrique du ministère des Communications du Canada.

Nortel Networks Inc. software license agreement

This Software License Agreement ("License Agreement") is between you, the end-user ("Customer") and Nortel Networks Corporation and its subsidiaries and affiliates ("Nortel Networks"). PLEASE READ THE FOLLOWING CAREFULLY. YOU MUST ACCEPT THESE LICENSE TERMS IN ORDER TO DOWNLOAD AND/OR USE THE SOFTWARE. USE OF THE SOFTWARE CONSTITUTES YOUR ACCEPTANCE OF THIS LICENSE AGREEMENT. If you do not accept these terms and conditions, return the Software, unused and in the original shipping container, within 30 days of purchase to obtain a credit for the full purchase price.

"Software" is owned or licensed by Nortel Networks, its parent or one of its subsidiaries or affiliates, and is copyrighted and licensed, not sold. Software consists of machine-readable instructions, its components, data, audio-visual content (such as images, text, recordings or pictures) and related licensed materials including all whole or partial copies. Nortel Networks grants you a license to use the Software only in the country where you acquired the Software. You obtain no rights other than those granted to you under this License Agreement. You are responsible for the selection of the Software and for the installation of, use of, and results obtained from the Software.

1. Licensed Use of Software. Nortel Networks grants Customer a nonexclusive license to use a copy of the Software on only one machine at any one time or to the extent of the activation or authorized usage level, whichever is applicable. To the extent Software is furnished for use with designated hardware or Customer furnished equipment ("CFE"), Customer is granted a nonexclusive license to use Software only on such hardware or CFE, as applicable. Software contains trade secrets and Customer agrees to treat Software as confidential information using the same care and discretion Customer uses with its own similar information that it does not wish to disclose, publish or disseminate. Customer will ensure that anyone who uses the Software does so only in compliance with the terms of this Agreement. Customer shall not a) use, copy, modify, transfer or distribute the Software except as expressly authorized; b) reverse assemble, reverse compile, reverse engineer or otherwise translate the Software; c) create derivative works or modifications unless expressly authorized; or d) sublicense, rent or lease the Software. Licensors of intellectual property to Nortel Networks are beneficiaries of this provision. Upon termination or breach of the license by Customer or in the event designated hardware or CFE is no longer in use, Customer will promptly return the Software to Nortel Networks or certify its destruction. Nortel Networks may audit by remote polling or other reasonable means to determine Customer's Software activation or usage levels. If suppliers of third party software included in Software require Nortel Networks to include additional or different terms, Customer agrees to abide by such terms provided by Nortel Networks with respect to such third party software.

2. Warranty. Except as may be otherwise expressly agreed to in writing between Nortel Networks and Customer, Software is provided "AS IS" without any warranties (conditions) of any kind. NORTEL NETWORKS DISCLAIMS ALL WARRANTIES (CONDITIONS) FOR THE SOFTWARE, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE AND ANY WARRANTY OF NON-INFRINGEMENT. Nortel Networks is not obligated to provide support of any kind for the Software. Some jurisdictions do not allow exclusion of implied warranties, and, in such event, the above exclusions may not apply.

3. Limitation of Remedies. IN NO EVENT SHALL NORTEL NETWORKS OR ITS AGENTS OR SUPPLIERS BE LIABLE FOR ANY OF THE FOLLOWING: a) DAMAGES BASED ON ANY THIRD PARTY CLAIM; b) LOSS OF, OR DAMAGE TO, CUSTOMER'S RECORDS, FILES OR DATA; OR c) DIRECT, INDIRECT, SPECIAL, INCIDENTAL, PUNITIVE, OR CONSEQUENTIAL DAMAGES (INCLUDING LOST PROFITS OR SAVINGS), WHETHER IN CONTRACT, TORT OR OTHERWISE (INCLUDING NEGLIGENCE) ARISING OUT OF YOUR USE OF THE SOFTWARE, EVEN IF NORTEL NETWORKS, ITS AGENTS OR SUPPLIERS HAVE BEEN ADVISED OF THEIR POSSIBILITY. The forgoing limitations of remedies also apply to any developer and/or supplier of the Software. Such developer and/or supplier is an intended beneficiary of this Section. Some jurisdictions do not allow these limitations or exclusions and, in such event, they may not apply.

4. General

- a. If Customer is the United States Government, the following paragraph shall apply: All Nortel Networks Software available under this License Agreement is commercial computer software and commercial computer software documentation and, in the event Software is licensed for or on behalf of the United States Government, the respective rights to the software and software documentation are governed by Nortel Networks standard commercial license in accordance with U.S. Federal Regulations at 48 C.F.R. Sections 12.212 (for non-DoD entities) and 48 C.F.R. 227.7202 (for DoD entities).
- b. Customer may terminate the license at any time. Nortel Networks may terminate the license if Customer fails to comply with the terms and conditions of this license. In either event, upon termination, Customer must either return the Software to Nortel Networks or certify its destruction.
- c. Customer is responsible for payment of any taxes, including personal property taxes, resulting from Customer's use of the Software. Customer agrees to comply with all applicable laws including all applicable export and import laws and regulations.
- d. Neither party may bring an action, regardless of form, more than two years after the cause of the action arose.
- e. The terms and conditions of this License Agreement form the complete and exclusive agreement between Customer and Nortel Networks.
- f. This License Agreement is governed by the laws of the country in which Customer acquires the Software. If the Software is acquired in the United States, then this License Agreement is governed by the laws of the state of New York.

Contents

New in this release	15
Features	15
1000BASE-T (1000 GT) Ethernet card	15
How to get help	17
Finding the latest updates on the Nortel Web site	17
Getting help from the Nortel Web site	17
Getting help over the phone from a Nortel Solutions Center	18
Getting help from a specialist by using an Express Routing Code	18
Getting help through a Nortel distributor or reseller	19
Preface	21
Before you begin	21
Text conventions	22
Acronyms	22
Related publications	23
Printed technical manuals	24
Chapter 1	
Installing the Nortel VPN Router 2750 chassis	25
Description of the Nortel VPN Router 2750	25
Preparing to install the Nortel VPN Router 2750	26
Shipment contents	27
Additional equipment	28
Cables	28
Hardware for mounting the chassis in an equipment rack	28
Site requirements	28

Installing the chassis	29
Installing the chassis on a flat surface	29
Installing the chassis in an equipment rack	30
Rack-mount recommendations	30
Attaching the shelf in the equipment rack	30
Mounting the chassis in the equipment rack	32

Chapter 2

Cabling the VPN Router and turning the power on 35

Connecting communications cables	36
Connecting the power cord	37
Verifying a successful installation	39
Understanding the LEDs	40
Front panel LEDs	40
LEDs on the system 10/100BASE-TX Ethernet ports	41
10/100BASE-TX Ethernet interface card LEDs	42
1000BASE-T (1000 GT) Ethernet interface card LEDs	43
1000BASE-T (1000 MT) Ethernet interface card LEDs	43
1000BASE-SX Ethernet interface card LED	44
56/64K CSU/DSU WAN interface card LEDs	46
ADSL WAN interface card LEDs	47
T1/E1 CSU/DSU WAN interface card LEDs	48
Quad T1/E1 CSU/DSU WAN interface card LEDs	49
Single V.35/X.21 WAN interface card LEDs	50
SSL VPN Module 1000 LEDs	51

Chapter 3

Configuring the management IP interface. 53

Required information	54
Configuring the management IP address	55
Testing the configuration	59
Troubleshooting	60

Chapter 4	
Installing option cards and DIMMs	61
Shutting down the system to add or replace hardware	62
Removing the front bezel and top cover	63
Attaching the antistatic wrist strap	67
Installing and replacing option cards	68
Installing and replacing an option card	69
Installing and replacing DIMMs	72
Appendix A	
Technical specifications	77
Chassis specifications	77
System ports	78
10/100BASE-TX Ethernet LAN ports	78
Serial port	79
Modem cable specifications	80
Hardware option cards	81
VPN Router Security Accelerator	82
SSL VPN Module 1000	83
10/100BASE-TX Ethernet interface card	84
1000BASE-T (1000 GT) Ethernet interface card	85
1000BASE-T (1000 MT) Ethernet interface card	87
1000BASE-SX Ethernet interface card	88
56/64K CSU/DSU WAN interface card	89
ADSL WAN interface card	91
ISDN BRI interface card	92
T1/E1 CSU/DSU WAN interface card	94
Quad T1/E1 CSU/DSU WAN interface card	96
V.90 modem interface card	97
Single V.35/X.21 WAN interface card	98
HSSI WAN interface card	101

Index	103
--------------------	------------

Figures

Figure 1	Front view of the Nortel VPN Router 2750	26
Figure 2	Placement of rubber feet on the bottom of the chassis	29
Figure 3	Attaching the cage nuts to the rack	31
Figure 4	Installing the shelf in the equipment rack	31
Figure 5	Removing the front bezel	32
Figure 6	Replacing the front bezel	33
Figure 7	Rear view of the Nortel VPN Router 2750	37
Figure 8	Front panel LEDs	40
Figure 9	LEDs on the system 10/100BASE-TX Ethernet ports	41
Figure 10	LEDs on the 10/100BASE-TX Ethernet interface card	42
Figure 11	LEDs on the 1000 GT Ethernet interface card	43
Figure 12	LEDs on the 1000BASE-T (1000 MT) Ethernet interface card	44
Figure 13	LED on the 1000BASE-SX Ethernet interface card	44
Figure 14	LEDs on the 56/64K CSU/DSU WAN interface card	46
Figure 15	LEDs on the ADSL WAN interface card	47
Figure 16	LEDs on the T1/E1 CSU/DSU WAN interface card	48
Figure 17	LEDs on the quad T1/E1 CSU/DSU WAN interface card	49
Figure 18	LEDs on the single V.35/X.21 WAN interface card	50
Figure 19	LEDs on the SSL VPN Module 1000	51
Figure 20	Removing the front bezel	63
Figure 21	Removing the top cover	65
Figure 22	Location of option card and DIMM slots on the system board	66
Figure 23	Location of the grounding jack for the antistatic wrist strap	67
Figure 24	Installing and removing an option card	71
Figure 25	Replacing the front bezel	72
Figure 26	Installing and removing a DIMM	74
Figure 27	10/100BASE-TX Ethernet connector	79
Figure 28	Serial cable (9-pin D-sub plug to RS-232-C modem plug)	80
Figure 29	Modem cable (9-pin D-sub plug to RS-232-C modem plug)	81

Figure 30	VPN Router Security Accelerator card	82
Figure 31	SSL VPN Module 1000	83
Figure 32	10/100BASE-TX Ethernet interface card	84
Figure 33	1000BASE-T (1000 GT) Ethernet interface card (all models except VPN Router 2750 1100) 86	
Figure 34	1000BASE-T (1000 MT) Ethernet interface card	87
Figure 35	1000BASE-SX Ethernet interface card	88
Figure 36	56/64K CSU/DSU WAN interface card	89
Figure 37	ADSL WAN interface card	91
Figure 38	ISDN BRI S/T or IDSDN BRI U	92
Figure 39	T1/E1 CSU/DSU WAN interface card (half-height card)	94
Figure 40	T1/E1 CSU/DSU WAN interface card (full-height card)	94
Figure 41	Quad T1/E1 CSU/DSU WAN interface card	96
Figure 42	V.90 modem interface card	97
Figure 43	Single V.35/X.21 WAN interface card	98
Figure 44	HSSI WAN interface card	101

Tables

Table 1	Items shipped with the Nortel VPN Router 2750	27
Table 2	Interfaces and cables for the Nortel VPN Router 2750	36
Table 3	Power cord requirements	38
Table 4	Front panel LED indicators	40
Table 5	LED indicators on the system 10/100BASE-TX Ethernet ports	41
Table 6	LED indicators on the 10/100BASE-TX Ethernet interface card	42
Table 7	LED indicators on the 1000 GT Ethernet interface card	43
Table 8	LED indicators on the 1000BASE-T (1000 MT) Ethernet interface card ..	44
Table 9	LED indicator on the 1000BASE-SX Ethernet interface card	45
Table 10	LED indicators on the 56/64K CSU/DSU WAN interface card	46
Table 11	LED indicators on the ADSL WAN interface card	47
Table 12	LED indicators on the T1/E1 CSU/DSU WAN interface card	48
Table 13	LED indicators on the quad T1/E1 CSU/DSU WAN interface card	49
Table 14	LED indicators on the single V.35/X.21 WAN interface card	50
Table 15	LED indicators on the SSL VPN Module 1000	51
Table 16	Supported option cards for the Nortel VPN Router 2750 2750	68
Table 17	Installing other option cards with the SSL VPN Module 1000	69
Table 18	Physical, electrical, and environmental specifications	77
Table 19	10/100BASE-X Ethernet port pinouts	79
Table 20	Multiple DB9 and DB25 connector pinouts	80
Table 21	Modem cable pinouts	81
Table 22	1000BASE-T (1000 GT) Ethernet pinouts	86
Table 23	1000BASE-T Ethernet port pinouts	87
Table 24	56/64K CSU/DSU cable pinouts for crossover connection	90
Table 25	56/64K CSU/DSU cable pinouts for straight-through connection	90
Table 26	ADSL Annex A cable pinouts	91
Table 27	ADSL Annex B cable pinouts	92
Table 28	ISDN BRI S/T cable pinouts	93
Table 29	ISDN BRI U cable pinouts	93

Table 30	T1/E1 CSU/DSU cable pinouts for crossover connection	95
Table 31	T1/E1 CSU/DSU cable pinouts for straight-through connection	96
Table 32	V.90 modem cable pinouts	98
Table 33	V.35 cable pinouts	98
Table 34	X.21 cable pinouts	100
Table 35	T3 cable pinouts	101

New in this release

The following section details what's new in *Nortel VPN Router Installation—VPN Router 2750* (NN46110-318) for Release 7.05.300.

Features

See the following sections for information about feature-related changes.

1000BASE-T (1000 GT) Ethernet card

The 1000BASE-T (1000 GT) Ethernet card is new for Release 7.05.300. See [“1000BASE-T \(1000 GT\) Ethernet interface card LEDs” on page 43](#) and [“1000BASE-T \(1000 GT\) Ethernet interface card” on page 85](#).

How to get help

This chapter explains how to get help for Nortel products and services.

Finding the latest updates on the Nortel Web site

The content of this documentation was current at the time the product was released. To check for updates to the latest documentation and software for the VPN Router 2750, go to:

www.nortel.com/support

Select Security & VPN and then, in the section called Virtual Private Networking (VPN), IPSEC, and SSL, click the appropriate VPN Router product.

Getting help from the Nortel Web site

The best way to get technical support for Nortel products is from the Nortel Technical Support Web site:

www.nortel.com/support

This site provides quick access to software, documentation, bulletins, and tools to address issues with Nortel products. From this site you can:

- download software, documentation, and product bulletins
- search the Technical Support site and the Nortel Knowledge Base for answers to technical issues
- sign up for automatic notification of new software and documentation for Nortel equipment
- open and manage technical support cases

Getting help over the phone from a Nortel Solutions Center

If you do not find the information you require on the Nortel Technical Support Web site, and you have a Nortel support contract, you can also get help over the phone from a Nortel Solutions Center.

In North America, call 1-800-4NORTEL (1-800-466-7835).

Outside North America, go to the following Web site to obtain the phone number for your region:

www.nortel.com/callus

Getting help from a specialist by using an Express Routing Code

To access some Nortel Technical Solutions Centers, you can use an Express Routing Code (ERC) to quickly route your call to a specialist in your Nortel product or service. To locate the ERC for your product or service, go to:

www.nortel.com/erc

Getting help through a Nortel distributor or reseller

If you purchased a service contract for your Nortel product from a distributor or authorized reseller, contact the technical support staff for that distributor or reseller.

Preface

The Nortel VPN Router 2750 is part of the Nortel VPN router product family. The VPN Nortel Routers support secure, reliable IP VPNs in a single, integrated hardware device. Throughout this guide, the VPN Router is also referred to as *the gateway*.

This guide provides instructions for installing the VPN Router 2750 for the first time and for replacing any field replaceable unit (FRU). This guide also provides some initial configuration information and includes technical specifications for the VPN Router 2750.

For complete information about configuring and monitoring the VPN Router 2750, see the documentation on the software CD. For information about VPN Router documentation, see [“Related publications” on page 23](#).

Before you begin

This guide is intended for qualified service personnel who are installing the VPN Router 2750 for the first time or who need to install or replace any of the following field replaceable units (FRU):

- LAN, WAN, and serial interface cards
- VPN Router Security Accelerator card
- SSL VPN Module 1000
- dual inline memory modules (DIMM)

Before you install the VPN Router 2750, ensure that you install all network wiring on the premises using standard cable system practices.

Text conventions

This guide uses the following text conventions:

bold Courier text	Indicates command names and options and text that you need to enter. Example: Use the show health command. Example: Enter terminal paging {off on} .
<i>italic text</i>	Indicates new terms and book titles.
plain Courier text	Indicates system output, for example, prompts and system messages. Example: File not found.
separator (>)	Shows menu paths. Example: Choose Status > Health Check.

Acronyms

This guide uses the following acronyms:

ADSL	asymmetric digital subscriber line
AES	Advanced Encryption Standard
AIS	alarm indication signal
CSU/DSU	channel service unit/digital service unit
DES	Data Encryption Standard
DIMM	dual inline memory module
DTE	data terminal equipment
FRU	field replaceable unit
GUI	graphical user interface
HSSI	High Speed Serial Interface
IP	Internet Protocol
IPsec	IP Security

ISDN	Integrated Services Digital Network
LAN	local area network
LED	light emitting diode
LOS	loss of signal
OOF	out of frame
PCI	peripheral component interconnect
SSL	Secure Sockets Layer
VPN	virtual private network
WAN	wide area network

Related publications

For complete information about configuring, monitoring, and managing the VPN Router 2750, refer to the following publications (included on the software CD):

- Release notes provide the latest information, including brief descriptions of the new features, problems fixed in this release, and known problems and workarounds.
- *Nortel VPN Router Configuration — Basic Features* (NN46110-500) introduces the product and provides information about initial configuration.
- *Nortel VPN Router Security — Servers, Authentication, and Certificates* (NN46110-600) provides instructions for configuring authentication servers and services, as well as digital certificates.
- *Nortel VPN Router Security — Firewalls, Filters, NAT, and QoS* (NN46110-601) provides instructions for configuring the Stateful Firewall, NAT, and VPN Router interface and tunnel filters.
- *Nortel VPN Router Configuration — Tunneling Protocols* (NN46110-503) provides instructions for configuring the tunneling protocols IPsec, L2TP, PPTP, and L2F.
- *Nortel VPN Router Configuration— Advanced Features* (NN46110-502) provides instructions for configuring 802.1Q VLANs, circuitless IP, advanced WAN settings, PPP, PPPoE, frame relay, ADSL and ATM, T1/E1 CSU/DSU interfaces, dial services and BIS, DLSw, IPX, and Hardware Accelerator cards.

- *Nortel VPN Router Configuration — Routing* (NN46110-504) provides instructions for configuring RIP, OSPF, and VRRP, as well as instructions for configuring ECMP, routing policy services, and client address redistribution.
- *Nortel VPN Router Configuration — SSL VPN Services* (NN46110-501) provides instructions for configuring services on the SSL VPN Module 1000, including authentication, networks, user groups, and portal links.
- *Nortel VPN Router Using the Command Line Interface* (NN46110-507) provides syntax, descriptions, and examples for the commands that you can use to configure, manage, and monitor the gateway.
- *Nortel VPN Router Troubleshooting* (NN46110-602) provides information about backup and recovery, file management, upgrading software, and troubleshooting. This guide also provides instructions for monitoring gateway status and performance.

Printed technical manuals

You can print selected technical manuals and release notes free, directly from the Internet. Go to www.nortel.com/documentation, find the product for which you need documentation, then locate the specific category and model or version for your hardware or software product. Use Adobe Reader to open the manuals and release notes, search for the sections you need, and print them on most standard printers. Go to Adobe Systems at www.adobe.com to download a free copy of the Adobe Reader.

Chapter 1

Installing the Nortel VPN Router 2750 chassis

This chapter describes how to install the VPN Router 2750 chassis.



Note: Before you install the chassis, ensure that you install all network wiring on the premises using standard cable system practices.

This chapter contains the following topics:

Topic	Page
Description of the Nortel VPN Router 2750	25
Preparing to install the Nortel VPN Router 2750	26
Installing the chassis	29

Description of the Nortel VPN Router 2750

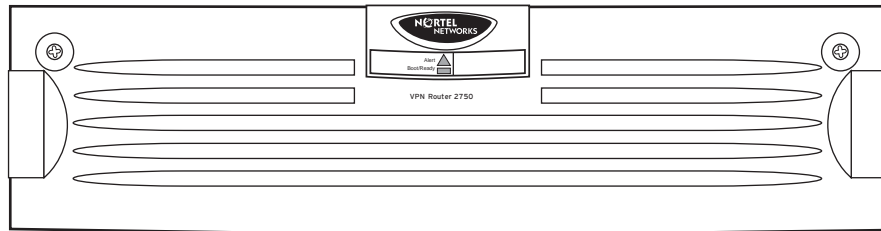
With the VPN Router 2750, you can supply scalable, secure, and robust Internet Protocol (IP) virtual private networks (VPN) across the public data network. The VPN Router 2750 provides routing, firewall, bandwidth management, encryption, authentication, and data integrity services to ensure secure tunneling across IP networks and the Internet.

The VPN Router 2750 is available in two models:

- VPN Router 2750 with five tunnels (128-bit)
- VPN Router 2750 with 2 000 tunnels (128-bit)

Figure 1 shows the front view of the Nortel VPN Router 2750.

Figure 1 Front view of the Nortel VPN Router 2750



CS260001D

The VPN Router 2750 chassis provides the following:

- two 10/100 Ethernet local area network (LAN) ports on the base system
- one serial port for out-of-band management of the VPN Router 2750
- four expansion peripheral component interconnect (PCI) slots that can contain optional interface cards, a VPN Router Security Accelerator card, and the Secure Sockets Layer (SSL) VPN Module 1000
- a memory of 256 MB that is upgradable to 512 MB total

Preparing to install the Nortel VPN Router 2750

Before you begin the installation, verify that:

- Your shipment is complete and undamaged.
- You have the cables, tools, and other equipment that you need.
- Your installation site meets the physical, electrical, and environmental requirements.

The sections that follow provide information to help you prepare for installation.

Shipment contents

In addition to the gateway and this guide, the shipping container for the VPN Router 2750 contains a number of hardware accessories and other items ([Table 1](#)).



Note: Nortel does not ship a power cord with the VPN Router 2750 unless you order one.

Table 1 Items shipped with the Nortel VPN Router 2750

Quantity	Item	Purpose
1	Rack mount shelf	Supports the chassis in the equipment rack
4	10-32 panhead screws	Secures the rack-mount shelf and the chassis to the equipment rack
4	10-32 panhead cage nuts	Used if the equipment rack does not have threaded rail holes
4	Rubber feet	Used to install the chassis on a surface
1	Antistatic wrist strap	Directs the discharge of static electricity from your body to the chassis to prevent damage to sensitive electronic components
1	Molded serial cable DB9/DB25-to-DB9/DB25	Connects the VPN Router 2750 to a PC or to a local terminal
1	<i>Nortel VPN Router Installation — VPN Router 2750</i> (this book)	Provides instructions for installing the chassis and hardware options
1	Recovery diskette	Used to restore the software image and file system
1	Nortel VPN Router software kit	Contains VPN Router software and documentation on CD
1	Nortel VPN client kit	Contains VPN Client software and documentation on CD
1	Sheet of labels	Used to note IP address (apply to front bezel)

Inspect all items for shipping damage. If you detect any damage, do not install the VPN Router 2750. Call the Nortel Technical Solutions Center in your area (see [“How to get help” on page 17](#)).

Additional equipment

You need items that are not included in the VPN Router 2750 shipping container. Before you begin the installation, ensure that you have all the cables, tools, and other equipment that you need.

Cables

You need cables that are not included in the VPN Router 2750 shipping container. For information about which cables are shipped and which ones you can order, see [“Connecting communications cables” on page 36](#). If you do not have the proper cables, contact your network administrator.

Hardware for mounting the chassis in an equipment rack

To install the VPN Router 2750 in an equipment rack, you need a Phillips screwdriver and an equipment rack that meets the following specifications:

- heavy-duty steel construction
- width of 19 in. (48.26 cm) and depth of 24 in. (60.96 cm)
- Electronic Industries Association (EIA) standard hole-spacing

If the rack does not have threaded rail holes, you must use the cage nuts shipped with the VPN Router 2750.

Site requirements

The installation site must provide sufficient free space around the VPN Router 2750 to ensure proper ventilation and access for servicing. For information about the physical, electrical, and environmental requirements for the VPN Router 2750, see [Appendix A, “Technical specifications,” on page 77](#).

Installing the chassis

To install the VPN Router 2750, do one of the following:

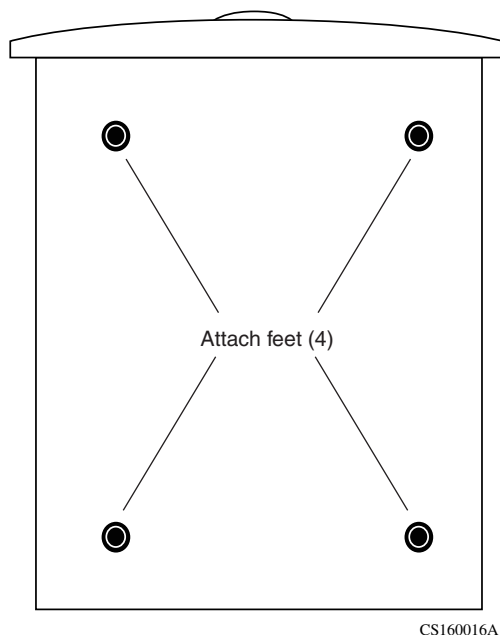
- Position the chassis on a flat, sturdy, horizontal surface.
- Mount the chassis in a standard equipment rack (see [“Installing the chassis in an equipment rack” on page 30](#)).

Installing the chassis on a flat surface

If you decide to place the VPN Router 2750 on a flat surface, ensure that the surface is large enough for the gateway and sturdy enough to support the combined weight of the VPN Router 2750 and the cables that you attach to it.

The VPN Router 2750 accessory kit includes four rubber feet that you can attach to the bottom of the gateway. [Figure 2](#) shows the placement of these rubber feet.

Figure 2 Placement of rubber feet on the bottom of the chassis



Installing the chassis in an equipment rack

To mount the VPN Router 2750 in an equipment rack, you need the following equipment:

- a standard 19-inch equipment rack
- four screws (supplied with the chassis)
- four cage nuts (supplied with the chassis) if the rack does not have threaded rail holes
- a #2 Phillips screwdriver

Rack-mount recommendations

When you mount the chassis in the equipment rack, observe the following standard recommendations:

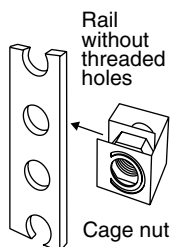
- Nortel recommends a maximum ambient temperature of 40°C (104°F). Ensure that the internal temperature of the rack does not exceed (104°F).
- Do not block the power supply vents or otherwise restrict air flow when installing the chassis in the rack.
- Stabilize your rack so that it does not tip over under the weight of the gateway and other devices.
- Ensure that the electrical branch circuits can handle the VPN Router 2750 and other units in the rack before you install and turn on the gateway.
- Maintain a reliable earth-ground path in the rack system. You must connect the gateway to an earth ground.

Attaching the shelf in the equipment rack

The VPN Router 2750 ships with a rack-mount shelf to support the chassis in the equipment rack.

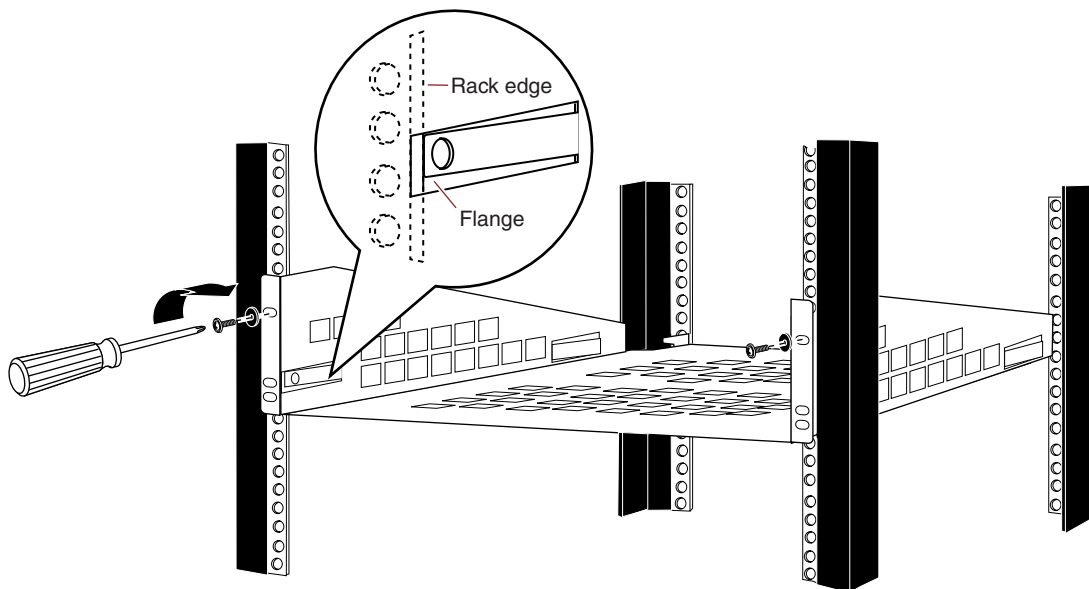
To attach the shelf to the inside of the equipment rack:

- 1 If the holes in the rack's vertical supports are not threaded, attach a cage nut in four locations at the front of the rack ([Figure 3 on page 31](#)).

Figure 3 Attaching the cage nuts to the rack

CS260003A

- 2 Position the rack-mount shelf inside the rack as shown in [Figure 4](#).
- 3 Align the holes in the shelf with holes in the front of the rack.

Figure 4 Installing the shelf in the equipment rack

CS260003A

- 4 Snap the support flange into place ([Figure 4](#)). Ensure that the alignment pin above the flange fits into the appropriate hole.
- 5 Insert one of the supplied panhead screws through the top hole on each side of the shelf into the hole in the rack, and tighten the screws ([Figure 4](#)).

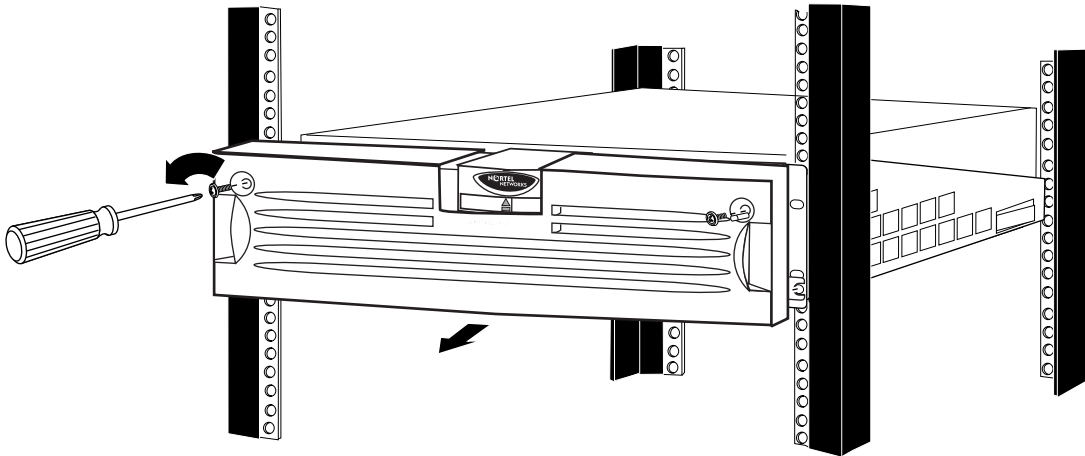
Mounting the chassis in the equipment rack

Nortel recommends that two people install the chassis in the rack.

To install the VPN Router 2750 in the equipment rack:

- 1 Set the VPN Router 2750 on the rack-mount shelf.
- 2 Remove the front bezel from the VPN Router 2750 (Figure 5).
 - a Use the Phillips screwdriver to turn each of the two screws on the front bezel a quarter turn counterclockwise.

Figure 5 Removing the front bezel



CS260015E

- b Grip the two handles, and firmly pull the bezel toward you to unsnap it from the chassis.



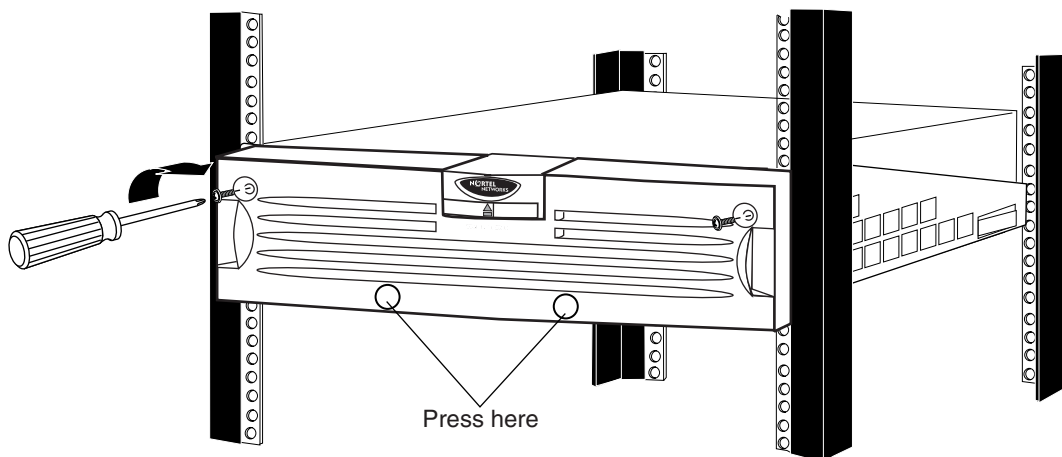
Caution: Risk of equipment damage

Do not use the piece with the Nortel logo and the LEDs as a handle.

The first several times that you remove the front bezel, the bezel can stick because the ball studs and socket clips are new.

- 3 Insert one of the supplied panhead screws through the bottom hole on each side of the shelf into the hole in the rack, and tighten the screws ([Figure 4 on page 31](#)).
- 4 Replace the front bezel ([Figure 6](#)).
 - a Hold the two handles on the bezel, and push it onto the chassis.
 - b Use the Phillips screwdriver to tighten the two screws that secure the bezel to the chassis.

Figure 6 Replacing the front bezel




CS260005E

Chapter 2


Cabling the VPN Router and turning the power on

This chapter provides information about how to connect communications cables and the power cord to the VPN Router 2750.

 **Caution:** Connect the cables to the built-in Ethernet ports and to the interfaces on the option cards installed in the VPN Router 2750 before you plug the power cord into the outlet.

This chapter contains the following topics:

Topic	Page
Connecting communications cables	36
Connecting the power cord	37
Verifying a successful installation	39
Understanding the LEDs	40

 **Caution:** You must route the cabling for all wide area network (WAN), local area network (LAN), and serial connections inside the building environment.

Connecting communications cables

Gather the cables to attach to the VPN Router 2750.

[Table 2](#) lists the system ports and the ports provided on the optional interface cards that you can install in the VPN Router 2750. The table also indicates whether you can obtain cables for the ports from Nortel.

Table 2 Interfaces and cables for the Nortel VPN Router 2750

Interface	Cable available from Nortel		Contact supplier
	Included	Ordered separately	
10/100BASE-TX Ethernet system ports			X
Serial port	X		
10/100BASE-TX Ethernet			X
1000BASE-T (1000 GT) Ethernet			X
1000BASE-T (1000 MT) Ethernet (copper)			X
1000BASE-SX Ethernet (fiber)		X ¹	
56/64K CSU/DSU WAN			X
ADSL WAN	X		
ISDN BRI			X
V.90 modem	X		
T1/E1 CSU/DSU WAN			X
Quad T1/E1 CSU/DSU WAN			X
Single V.35/X.21 WAN		X ²	
HSSI WAN	X		

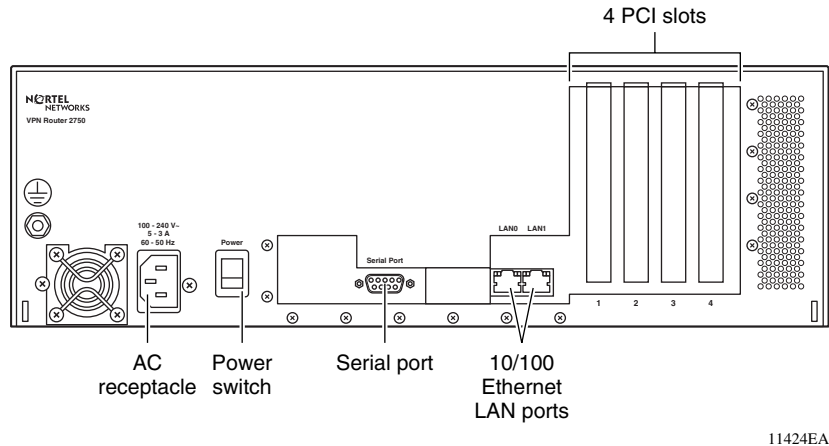
1 Order either the LC-to-LC cable or the LC-to-SC cable.

2 Order either the V.35 cable or the X.21 cable.

For information about the connectors and cable pinouts, see [Appendix A](#), “Technical specifications,” on page 77.

Figure 7 shows the back of the VPN Router 2750. All interface cables and the power cord attach to the rear of the gateway.

Figure 7 Rear view of the Nortel VPN Router 2750



Connect the interface cables to the VPN Router 2750 in this order:

- 1 Connect the 10/100BASE-X RJ-45 cables to the built-in 10/100BASE-X Ethernet LAN ports on the gateway (Figure 7).
- 2 Connect the serial cable shipped with the VPN Router 2750 to the serial port (Figure 7), if you plan to connect a terminal or PC to the gateway.
- 3 Connect all other cables to the ports on the installed interface cards.

If you ordered optional interface cards, connect the cables for these interfaces to the ports.

Connecting the power cord

You must order the power cord for the VPN Router 2750 separately.



Caution: Risk of equipment damage

Do not modify or use the AC power cord if it is not the exact type that is required for your power outlet.

The power cord must meet the requirements described in [Table 3](#).

Table 3 Power cord requirements

Requirement	Description
Current rating	The power cord must be rated for the available AC voltage and must have a current rating that is at least 125 percent of the gateway's current rating (5 A @ 100 VAC or 3 A @ 240 VAC).
Certification	The power cord must have certification marks from an acceptable regional agency.
Cord length and flexibility	The power cord must be less than 4.5 meters (14.7 feet) long. It must be a flexible HAR (harmonized) cord or VDE-certified cordage to comply with the gateway's safety certifications.
Power supply connector	The connector that you plug into the AC receptacle on the gateway must be an IEC 320, Sheet C13 female.
Wall outlet connector	The power cord must terminate in a male plug with appropriate grounding.

To connect the power cord and turn on the system power:

- 1 Connect the power cord to the AC receptacle on the back of the gateway (see [Figure 7 on page 37](#)).
- 2 Connect the power cord to the power outlet.



Caution: Risk of equipment damage

Protect the VPN Router 2750 by plugging it into a surge suppressor.

- 3 Press and release the power switch on the rear of the VPN Router 2750 ([Figure 7 on page 37](#)), and wait for the gateway to boot.

Verifying a successful installation

After you connect the gateway to the power source and turn it on, you can verify a successful installation by checking the light emitting diodes (LED) on the front panel ([Figure 8 on page 40](#)).

The following sequence of LEDs should occur:

- 1 The power LED (the Nortel logo) lights blue.
- 2 The Alert LED lights red, and the Boot/Ready LED lights green.
- 3 The Boot/Ready LED lights yellow, and the Alert LED turns off when the gateway begins its boot sequence.
- 4 The Boot/Ready LED lights green to indicate that the gateway is operational after the boot process is complete.
- 5 The Alert LED lights yellow because the gateway is not configured.

For a newly installed VPN Router 2750, a yellow Alert LED does not indicate an alarm condition. After you configure the gateway, the Alert LED turns off. (See [Chapter 3, “Configuring the management IP interface,” on page 53](#).)

If the LEDs on the front panel light in this sequence, your installation is successful. If the LEDs do not light in this sequence, check that you correctly installed the bezel on the gateway and that you properly attached the power cord to the power supply (see [“Connecting the power cord” on page 37](#)).

If the VPN Router 2750 still does not boot, contact your local Nortel Technical Solutions Center (see [“How to get help” on page 17](#)).

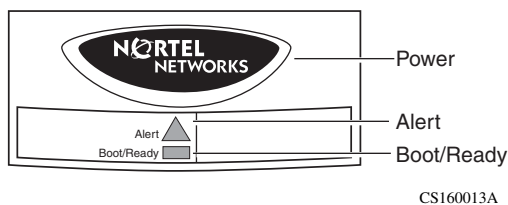
Understanding the LEDs

This section describes the LEDs on the front panel of the VPN Router 2750 and on the interface cards that have LEDs. You can confirm that you properly cabled the LAN and WAN interfaces by examining the LEDs.

Front panel LEDs

The front panel of the VPN Router 2750 has a lighted Nortel logo and two LEDs ([Figure 8](#)). These LEDs indicate the status of the VPN Router 2750.

Figure 8 Front panel LEDs



[Table 4](#) describes the LEDs on the VPN Router 2750 front panel.

Table 4 Front panel LED indicators

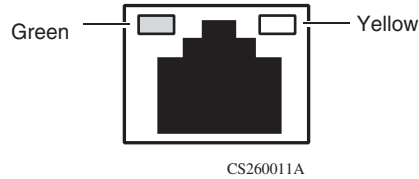
LED	Indicator	Description
Power (Nortel logo)	On	The gateway is receiving AC power.
	Off	The gateway is not receiving AC power.
Alert	Yellow	A non-fatal alarm condition exists. The yellow alert condition is described in the health check display.
	Red	A serious alarm condition exists that requires attention. A red alert usually indicates a hardware error. The red alert condition is described in the health check display.
Boot/Ready	Yellow	The gateway is booting and is in a non-ready state.
	Green	The boot process is complete and the gateway is in a state of readiness.

For complete information about the health check, event log, and system log, see *Nortel VPN Router Troubleshooting*.

LEDs on the system 10/100BASE-TX Ethernet ports

Each of the two 10/100BASE-TX Ethernet ports on the rear of the VPN Router 2750 has two LEDs ([Figure 9](#)).

Figure 9 LEDs on the system 10/100BASE-TX Ethernet ports



[Table 5](#) describes the LEDs on the system 10/100BASE-TX Ethernet ports.

Table 5 LED indicators on the system 10/100BASE-TX Ethernet ports

LED	Indicator	Description
Green	On	The LAN port is operating at 100 Mb/s.
	Off	The LAN port is operating at 10 Mb/s.
Yellow	On	The cable connections between the LAN port and the hub are good.
	Off	The cable connections between the LAN port and the hub are faulty.
	Flashing	The LAN port is sending or receiving network data. The frequency of the flashes increases with increased traffic.

10/100BASE-TX Ethernet interface card LEDs

Figure 10 shows the LEDs on the 10/100BASE-TX Ethernet interface card.

Figure 10 LEDs on the 10/100BASE-TX Ethernet interface card

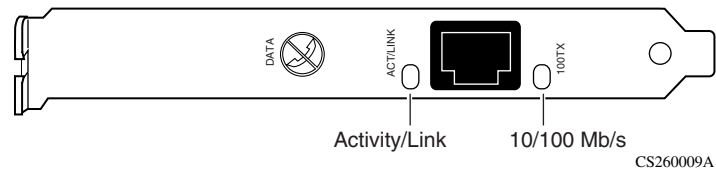


Table 6 describes the LEDs on the 10/100BASE-TX Ethernet interface card.

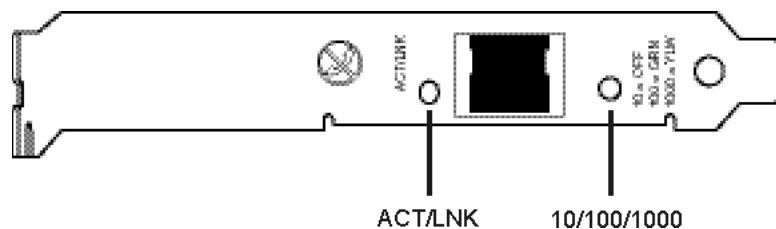
Table 6 LED indicators on the 10/100BASE-TX Ethernet interface card

LED	Indicator	Description
ACT/LINK	Steady green or Flashing green	The card is sending or receiving network data. The frequency of the flashes increases with increased traffic.
	Off	The card is not sending or receiving data.
10/100TX	Green	The port is operating at 100 Mb/s.
	Off	The port is operating at 10 Mb/s.

1000BASE-T (1000 GT) Ethernet interface card LEDs

The following figure shows the LEDs on the 10BASE-T/100BASE-TX/1000BASE-T 1000 GT Ethernet interface card.

Figure 11 LEDs on the 1000 GT Ethernet interface card



The following table describes the LEDs on the 1000 GT Ethernet interface card.

Table 7 LED indicators on the 1000 GT Ethernet interface card

LED	Indicator	Description
ACT/LINK	Steady green	The port is connected to a valid link partner.
	Flashing green	The card is sending or receiving network data. The frequency of the flashes increases with increased traffic.
	Off	The card is not sending or receiving data.
10/100/1000	Yellow	The port is operating at 1000 Mb/s.
	Green	The port is operating at 100 Mb/s.
	Off	The port is operating at 10 Mb/s.

1000BASE-T (1000 MT) Ethernet interface card LEDs

[Figure 12](#) shows the LEDs on the 1000BASE-T Ethernet interface card.

Figure 12 LEDs on the 1000BASE-T (1000 MT) Ethernet interface card

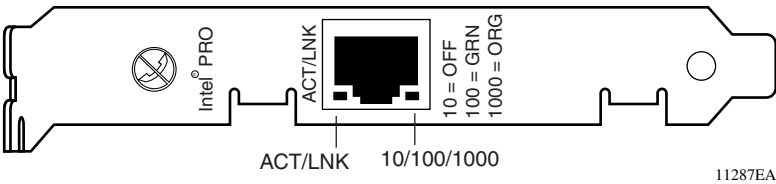


Table 8 describes the LEDs on the 1000BASE-T Ethernet interface card.

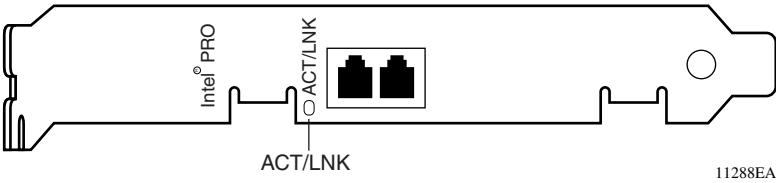
Table 8 LED indicators on the 1000BASE-T (1000 MT) Ethernet interface card

LED	Indicator	Description
ACT/LNK	Steady green	The port is connected to a valid link partner.
	Flashing green	The LAN port is sending or receiving network data.
	Off	The port is not linked to a valid partner.
10/100/1000	Off	The LAN port is operating at 10 Mb/s.
	Green	The LAN port is operating at 100 Mb/s.
	Orange	The LAN port is operating at 1000 Mb/s.

1000BASE-SX Ethernet interface card LED

Figure 13 shows the LED on the 1000BASE-SX Ethernet interface card.

Figure 13 LED on the 1000BASE-SX Ethernet interface card



[Table 9](#) describes the LED on the 1000BASE-SX Ethernet interface card.

Table 9 LED indicator on the 1000BASE-SX Ethernet interface card

LED	Indicator	Description
ACT/LNK	Steady green	The port is connected to a valid link partner.
	Flashing green	The LAN port is sending or receiving network data.
	Off	The port is not linked to a valid partner.

56/64K CSU/DSU WAN interface card LEDs

Figure 14 shows the LEDs on the 56/64K CSU/DSU WAN interface card.

Figure 14 LEDs on the 56/64K CSU/DSU WAN interface card

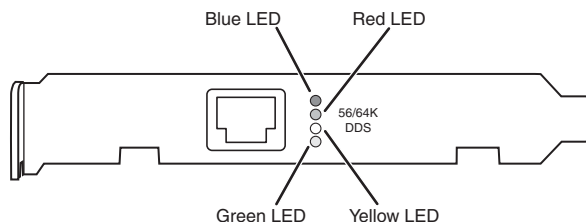


Table 10 describes the LEDs on the 56/64K CSU/DSU WAN interface card.

Table 10 LED indicators on the 56/64K CSU/DSU WAN interface card

LED	Description
Blue	The blue alarm LED is lit when the interface card detects a DDS out-of-frame (OOF) condition on the receive signal.
Red	The red alarm LED is lit when the interface card detects a DDS loss-of-signal (LOS) or loss-of-frame (LOF) condition on the receive signal.
Yellow	The yellow alarm LED is lit when the interface card detects a DDS out-of-service condition on the receive signal. (This LED indicates that the far-end equipment detects a local LOS or LOF condition.)
Green	The green LED is lit when the interface card receives valid DDS signal and framing (this LED indicates normal operation of the card.)
All LEDs off	The port is disabled.

ADSL WAN interface card LEDs

Figure 15 shows the LEDs on the asymmetric digital subscriber line (ADSL) WAN interface card.

Figure 15 LEDs on the ADSL WAN interface card

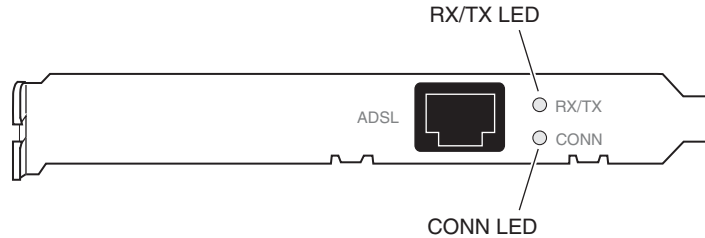


Table 11 describes the LEDs on the ADSL WAN interface card.

Table 11 LED indicators on the ADSL WAN interface card

CONN LED	Tx/Rx LED	Description
Steady green	Steady green	The ADSL interface card is not initialized; the software driver is not installed.
Off	Off	The ADSL interface card is initialized, but has not established a link with the ADSL network.
Flashing green	Off	The ADSL interface card is attempting to establish a link with the ADSL network.
Steady green	Off	The ADSL interface card has established a link with the ADSL network.
Steady green	Flashing green	The ADSL interface card is sending or receiving network data. (The LED can be dim.)

T1/E1 CSU/DSU WAN interface card LEDs

Figure 16 shows the LEDs on the T1/E1 CSU/DSU WAN interface card.

Figure 16 LEDs on the T1/E1 CSU/DSU WAN interface card

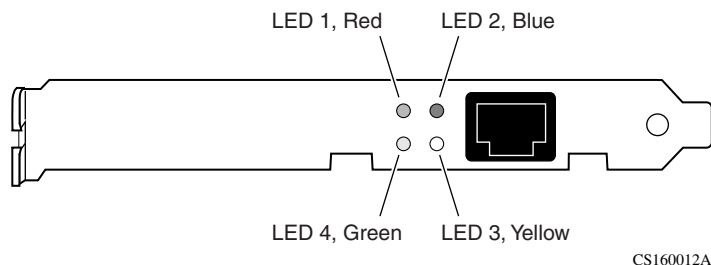


Table 12 describes the LEDs on the T1/E1 CSU/DSU WAN interface card.

Table 12 LED indicators on the T1/E1 CSU/DSU WAN interface card

LED	Indicator	Description
LED 1	Red	The red alarm LED is lit when a loss-of-signal (LOS) or out-of-frame (OOF) condition is detected on the receive signal.
LED 2	Blue	The blue alarm LED is lit when receiving an upstream failure denoted by an alarm indication signal (AIS).
LED 3	Yellow	The yellow alarm LED is lit when the far-end equipment is in the red alarm condition.
LED 4	Green	The green LED is lit when the condition is normal operation.

Quad T1/E1 CSU/DSU WAN interface card LEDs

Figure 17 shows the LEDs on the quad T1/E1 channel service unit/digital service unit (CSU/DSU) WAN interface card.

Figure 17 LEDs on the quad T1/E1 CSU/DSU WAN interface card

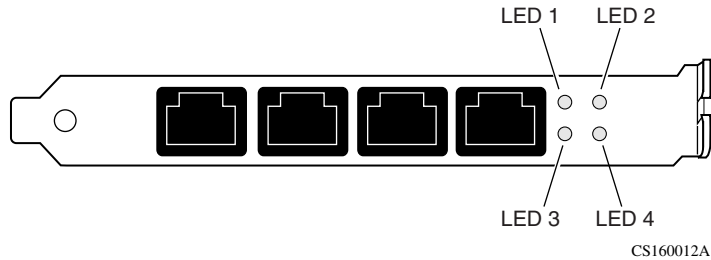


Table 13 describes the LEDs on the quad T1/E1 CSU/DSU WAN interface card.

Table 13 LED indicators on the quad T1/E1 CSU/DSU WAN interface card

LED	Indicator	Description
LED 1	Off	Port 1 is disabled.
	On	Port 1 is enabled and operating normally.
	Flashing	Port 1 is enabled and in an alarm state (red, yellow, or blue).
LED 2	Off	Port 2 is disabled.
	On	Port 2 is enabled and operating normally.
	Flashing	Port 2 is enabled and in an alarm state (red, yellow, or blue).
LED 3	Off	Port 3 is disabled.
	On	Port 3 is enabled and operating normally.
	Flashing	Port 3 is enabled and in an alarm state (red, yellow, or blue).
LED 4	Off	Port 4 is disabled.
	On	Port 4 is enabled and operating normally.
	Flashing	Port 4 is enabled and in an alarm state (red, yellow, or blue).

Single V.35/X.21 WAN interface card LEDs

Figure 18 shows the LEDs on the single V.35/X.21 WAN interface card.

Figure 18 LEDs on the single V.35/X.21 WAN interface card

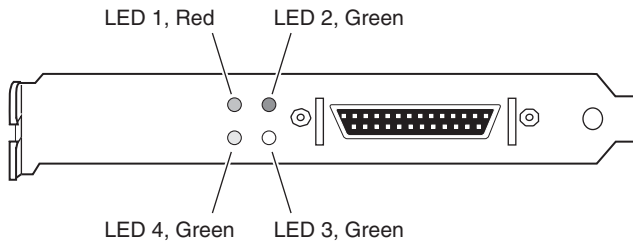


Table 14 describes the LEDs on the single V.35/X.21 WAN interface card.

Table 14 LED indicators on the single V.35/X.21 WAN interface card

LED	Indicator	Description
LED 1	Red	No external transmit clock source is available.
LED 2	Green	The signals CDC and DSR are on between the DSU and the adapter. LED 2 detects receive link status.
LED 3	Green	Power to the adapter is on and the onboard microcode is loaded.
LED 4	Green	Cable is detected.

SSL VPN Module 1000 LEDs

Figure 19 shows the LEDs on the Secure Sockets Layer (SSL) VPN Module 1000.

Figure 19 LEDs on the SSL VPN Module 1000

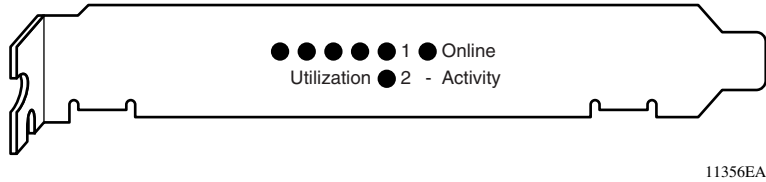


Table 15 describes the LEDs on the SSL VPN Module 1000.

Table 15 LED indicators on the SSL VPN Module 1000

LEDs	Indicator	Description
Online	Steady green	The SSL VPN Module 1000 is operating normally.
	Yellow	A reset occurred on the SSL VPN Module 1000.
	Off	The SSL VPN Module 1000 is not receiving power.
Activity LED 1	Steady green	The SSL VPN Module 1000 is operating normally.
	Flashing green	Activity is occurring on the SSL VPN Module 1000.
	Yellow	A reset occurred on the SSL VPN Module 1000.
Activity LED 2	—	Not used. (This LED is often lit, but it has no meaning.)
Utilization (4 LEDs)	Steady green	Together, these four LEDs indicate an approximate average level of CPU utilization. When one LED is lit, CPU utilization is approximately 25%; when two LEDs are lit, CPU utilization is approximately 50%.
	Blinking in unison	The SSL VPN Module 1000 is idle.

Chapter 3

Configuring the management IP interface

This chapter describes how to configure a management Internet Protocol (IP) address, subnet mask, and default gateway address on a newly installed VPN Router 2750. After you complete the procedures in this chapter, you can configure and manage the VPN Router 2750 using a Web browser from a PC.

To configure the management IP interface, you use the serial interface configuration menu. You must connect a PC or terminal to the serial port on the VPN Router 2750.

This chapter contains the following topics:

Topic	Page
Required information	54
Configuring the management IP address	55
Testing the configuration	59
Troubleshooting	60

Required information

Before you configure the management interface, collect this information:

- IP address for the management interface

The management IP address must be accessible from one of the private physical interfaces on the VPN Router 2750. For example, if you plan to assign IP address 10.2.3.3 with subnet mask 255.255.0.0 to the private physical interface, the management IP address must reside in the 10.2 network.

- Subnet mask

The subnet mask specifies which IP addresses are directly reachable on the network and which ones must be routed through a gateway. For example, the IP address 10.2.3.3 with a subnet mask of 255.255.0.0 indicates that all hosts with addresses 10.2.*n.n* are directly reachable.

- Default gateway (optional)

The default gateway routes packets to destinations for which there is no specific route in the routing table. You can configure a default gateway when you assign the management IP address, or you can configure it at a later time.



Note: Write down and save the management IP address. You need it to configure the VPN Router 2750.

Configuring the management IP address

You use the serial interface to assign the VPN Router 2750 a management IP address and subnet mask so that you can then use a Web browser for management.

To configure the management IP address using the serial interface:

- 1 Turn on the terminal or PC.

Configure the terminal or PC as follows:

- 9600 baud
- eight data bits
- one stop bit
- no parity
- no flow control

- 2 Connect the serial cable (supplied with the VPN Router 2750) from the gateway's serial port to a terminal or to the communications port on a PC.
- 3 On the PC, start HyperTerminal or another terminal emulation program, and press **Enter**.

The Welcome window appears.

```
Welcome to the VPN Router
Copyright (c) 1999-2005 Nortel Networks, Inc.
```

```
Version:           V06_20.004
Creation date:      Mar 7 2006, 13:52:02
Unit Serial Number: 19677
```

```
Please enter the administrator's user name:
```

- 4 Enter the default user name and password for the administrator.

The factory default user name is *admin* and the default password is *setup*. The user name and password are case sensitive.

```
Please enter the administrator's user name: admin
```

```
Please enter the administrator's password: *****
```

The serial main menu appears.

Main Menu: System is currently in NORMAL mode.

```
0) Management Address
1) Interfaces
2) Administrator
3) Default Private Route Menu
4) Default Public Route Menu
5) Create A User Control Tunnel (IPsec) Profile
6) Restricted Management Mode           FALSE
7) Allow HTTP Management               TRUE
8) Firewall Options
9) Shutdown
B) System Boot Options
P) Configure Serial Port
C) Controlled Crash
L) Command Line Interface
R) Reset System to Factory Defaults
E) Exit, Save and Invoke Changes
```

Please select a menu choice (0 - 9,B,P,C,L,R,E):

- 5** To configure the Interface IP address, from the serial menu, type **1** and press **Enter**.

The interface menu appears.

- Interface Menu

```
0) Slot 0, Port 2, Public LAN
   IP Address =
   Subnet Mask = 0.0.0.0
   Speed/Duplex = AutoNegotiate

1) Slot 0, Port 1, Private LAN
   IP Address =192.167.120.14
   Subnet Mask = 255.255.255.0
   Speed/Duplex = AutoNegotiate
```

R) Return to the Main Menu.

Please select a menu choice:

- 6** Type **0**, and press **Enter** to configure the IP address.

The IP address prompt appears.

```
0) Slot 0, Port 2, Public LAN
   IP Address =
   Subnet Mask = 0.0.0.0
   Speed/Duplex = AutoNegotiate
```

*Type 0.0.0.0 to delete.

*Just type <CR> to skip.

```
   Old IP address =
```

```
   New IP address =
```

- 7** Type a new IP address, and press **Enter**.

The subnet mask prompt appears.

```
Old Subnet Mask = 0.0.0.0
```

```
New Subnet Mask =
```

- 8** At the New Subnet Mask prompt, type the subnet mask for the management IP address, and press **Enter**.

The Speed/Duplex prompt appears.

- 9** Press **Enter** to leave the speed and duplex settings unchanged.

The Interface menu appears again with the changes you made.

```
0) Slot 0, Port 2, Public LAN
   IP Address =
   Subnet Mask = 0.0.0.0
   Speed/Duplex = AutoNegotiate
```

```
1) Slot 0, Port 1, Private LAN
   IP Address =192.167.120.14
   Subnet Mask = 255.255.255.0
   Speed/Duplex = AutoNegotiate
```

```
R) Return to the Main Menu.
```

```
Please select a menu choice:
```

Type **R**, and press **Enter** to return to the serial main menu.

- 10** To configure the management IP address, type **0**, and press **Enter**.

The Management IP Address menu appears.

- Management IP Address Menu

M) Management IP Address =

R) Return to the Main Menu

Please select a menu choice (M,R):

- 11** Type **M**, and press **Enter**.

The Management IP Address prompt appears.

*Type 0.0.0.0 to delete.

*Just type <CR> to skip.

Old management IP address =

New management IP address =

- 12** Type the new management IP address, and press **Enter** to configure the management IP address.

The new IP management address appears in the Management IP Address menu.

- Management IP address menu

M) Management IP Address =192.167.120.13

R) Return to the Main Menu

Please select a menu choice (M,R):

- 13** Type **R**, and press **Enter** to return to the serial main menu.

The serial main menu appears.

- 14** From the serial main menu, type **E**, and press **Enter** to save the new management IP address and mask and to exit the serial menu.

- 15** Go to the next section, [“Testing the configuration” on page 59](#) to verify that you can access the VPN Router 2750 from a Web browser.

Testing the configuration

After you assign a management IP address to the VPN Router 2750, start your Web browser to verify that you can access the gateway from the browser.

To manage the VPN Router 2750 using the GUI, your PC must be running one of the following browsers:

- Windows 2000 and NT
 - Internet Explorer 6.0
 - Mozilla 1.7
 - Firefox (all versions)
 - Netscape 7.x, 8.0.x or 8.1.x
- Unix
 - Firefox 1.5
 - Mozilla 1.7
- Linux
 - Firefox 1.5
 - Mozilla 1.7

To test the management IP address on the VPN Router 2750:

- 1 Open a Web browser.
- 2 In the URL field, enter **http://** followed by the management IP address that you assigned to the VPN Router 2750.

For example, if the management IP address is 47.17.248.52, enter **http://47.17.248.52**.

If the Welcome window appears, you correctly configured the management IP address for the VPN Router 2750.



Note: If the Welcome window does not appear, see [“Troubleshooting” on page 60](#).

- 3 Go to *Nortel VPN Router Configuration — Basic Features* (NN46110-602) for information about configuring the VPN Router 2750.

Troubleshooting

If you cannot connect to the VPN Router 2750 using your browser, check the following items:

- Ensure that you entered the correct IP address in the browser window.
- Type a known URL in the browser window to ensure that your network connection is good.
- Check that the management IP address that you configured is on the same subnet as the physical LAN attached to the gateway.
- Ensure that your PC is running a supported browser (see [“Testing the configuration” on page 59](#)).
- Check the physical connections on the VPN Router 2750, especially the LAN cables and the power cord.

If you still cannot connect to the VPN Router 2750 using a browser, connect a terminal or PC to the gateway with the serial cable and check the management IP address listed in the serial menu (see [“Configuring the management IP address” on page 55](#)). Reconfigure the management IP address if necessary.

If you cannot resolve the problem, contact the Nortel Technical Solutions Center closest to you (see [“How to get help” on page 17](#)).

Chapter 4

Installing option cards and DIMMs

This chapter provides instructions about how to install and replace the following field replaceable units (FRU) in the VPN Router 2750:

- LAN, WAN, and serial interface cards
- Secure Sockets Layer (SSL) VPN Module 1000
- VPN Router Security Accelerator card
- Dual inline memory modules (DIMM)

This chapter contains the following topics:

Topic	Page
Shutting down the system to add or replace hardware	62
Removing the front bezel and top cover	63
Attaching the antistatic wrist strap	67
Installing and replacing option cards	68
Installing and replacing DIMMs	72

Shutting down the system to add or replace hardware

To install or replace an option card or a DIMM, you must first shut down the VPN Router 2750 and unplug it.



Warning: Risk of electric shock

Shut down the VPN Router 2750 as described in this section before you attempt to add or replace an option card or DIMM.

To shut down the VPN Router 2750:

- 1 Use the Web graphical user interface (GUI) or the command line interface (CLI) to shut down the gateway.
 - Web GUI: Choose Admin > Shutdown. Select the option to power off the gateway after shutdown.
 - CLI: Use the **reload** command to shut down the system. For example, enter **reload power-off disable-logins "Upgrade hardware"**
For the complete syntax of the **reload** command, see *Nortel VPN Router Using the Command Line Interface* (NN46110-507).
- 2 Wait for the system to shut down.
- 3 Disconnect the power cord from the power outlet and then disconnect the cord from the VPN Router 2750.

The power receptacle is on the rear of the VPN Router 2750 (see [Figure 7 on page 37](#)).

Removing the front bezel and top cover

To install option cards or DIMMs, you must remove the front bezel and the top cover from the gateway.

To remove the front bezel:

- 1 Shut down the VPN Router 2750 using the Web GUI or the CLI, and then unplug it as described in [“Shutting down the system to add or replace hardware” on page 62](#).

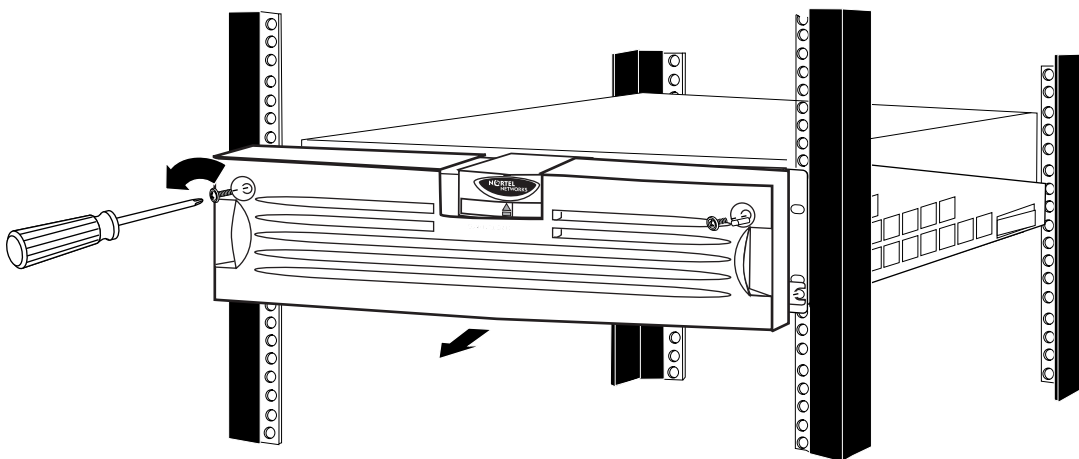


Warning: Risk of electric shock

Turn off the VPN Router 2750, and unplug it before you attempt to install an option card or DIMM.

- 2 Use a Phillips screwdriver to turn each of the two screws on the front bezel a quarter turn counterclockwise ([Figure 20](#)).

Figure 20 Removing the front bezel



CS260015E

- 3 Grip the two handles, and firmly pull the bezel toward you to unsnap it from the chassis.



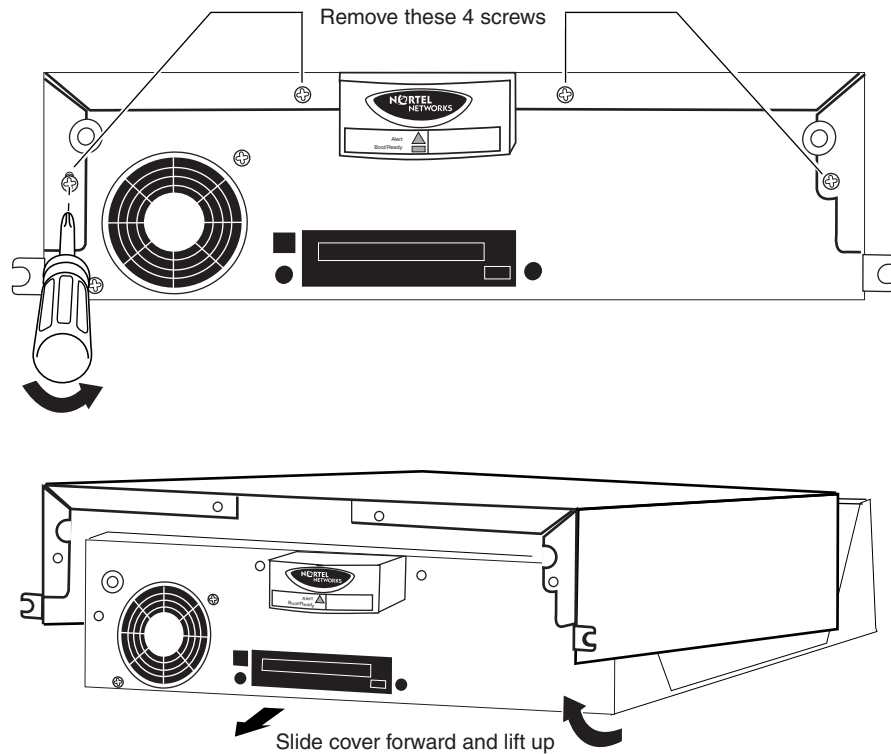
Caution: Risk of equipment damage

Do not use the piece with the Nortel logo and the LEDs as a handle.

The first several times that you remove the front bezel, the bezel can stick because the ball studs and socket clips are new.

To remove the top cover:

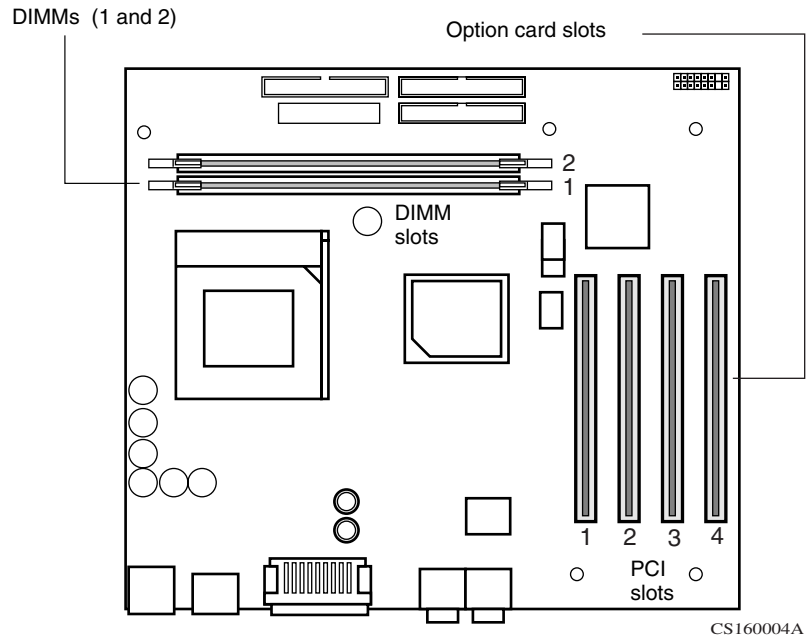
- 1 Remove the VPN Router 2750 from the rack if the router is installed in an equipment rack.
 - a At the front of the chassis, remove the two panhead screws that secure the bottom of the chassis to the equipment rack.
 - b Remove the VPN Router 2750 from the rack-mount shelf.
 - c Set the VPN Router 2750 on a sturdy surface.
- 2 Use a Phillips screwdriver to remove the four screws that secure the cover to the chassis ([Figure 21](#)).

Figure 21 Removing the top cover

CS260006A

- 3** Slide the top cover forward approximately 1/4 inch.
- 4** Lift the lid 2 or 3 inches, and pull it off the chassis.

The VPN Router 2750 system board is now exposed. [Figure 22](#) shows the location of the option card and DIMM slots on the system board.

Figure 22 Location of option card and DIMM slots on the system board**Warning: Risk of injury**

Beware of danger if you incorrectly replace the battery. Replace the battery with the same type or an equivalent battery only, as recommended by the manufacturer's instructions. In spite of this warning, which is mandated for regulatory approval, you must not change the battery. If you suspect a dead battery, contact Nortel Customer Support.

Attaching the antistatic wrist strap

Nortel ships the VPN Router 2750 with an antistatic wrist strap. The antistatic wrist strap directs the discharge of static electricity from your body to the chassis of the gateway to avoid damage to sensitive electronic components.

You must wear an antistatic wrist strap on your arm when you remove, install, or handle option cards and DIMMs.



Caution: Risk of equipment damage

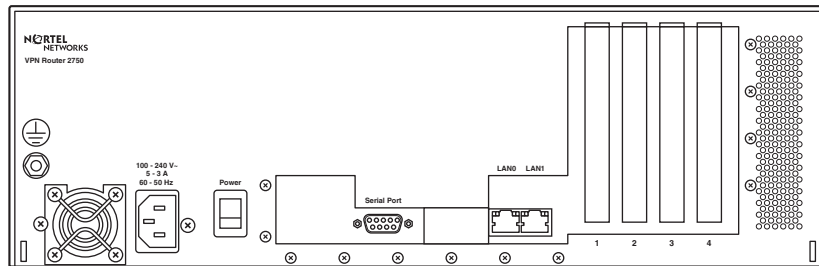
Electrostatic discharge can damage hardware. Follow the procedure in this section to protect your equipment from damage.

To attach the antistatic wrist strap:

- 1 Locate the antistatic wrist strap, and verify that the cable is attached to the wrist strap.
- 2 Place the strap around your wrist, and adjust the strap to ensure that the metal buckle inside the strap touches your skin.
- 3 Insert the banana plug into the grounding jack at the rear of the chassis (Figure 23).

Figure 23 Location of the grounding jack for the antistatic wrist strap

Grounding jack



11424EA

Installing and replacing option cards

The VPN Router 2750 has four slots for option cards ([Figure 22 on page 66](#)). This section provides instructions about adding new option cards to the gateway or, if necessary, replacing an existing card. [Table 16](#) lists the option cards that you can install in the VPN Router 2750.

Table 16 Supported option cards for the Nortel VPN Router 2750 2750

Option card	Maximum number	Restrictions
SSL VPN Module 1000 ¹	1	Install this card in slot 1 only.
VPN Router 2750 Security Accelerator ²	1	
10/100BASE-TX Ethernet interface	4	
1000BASE-T (1000 GT) Ethernet interface ³	4	
1000BASE-T (1000 MT) interface (copper) ⁴	2	Install two 1000BASE-T (1000 MT) (1000 MT) cards, two 1000BASE-SX cards, or one card of each type. (But see Table 17 on page 69 .)
1000BASE-SX interface (fiber) ⁵		
56/64K channel service unit/digital service unit (CSU/DSU) WAN interface ⁶	4	
Asymmetric digital subscriber line (ADSL) WAN interface ⁷	4	
Integrated Services Digital Network (ISDN) BRI S/T or U interface ⁸	4	
T1 CSU/DSU WAN interface (full-height)	4	For E1 support, you must install the half-height interface card.
T1/E1 CSU/DSU WAN interface (half-height)	4	
Quad T1/E1 CSU/DSU WAN interface ⁹	3	
V.90 modem interface ¹⁰	4	If an SSL VPN Module 1000 is in slot 1, do not install the V.90 modem interface card in slot 2.
Single V.35/X.21 WAN interface (full-height)	4	
Single V.35/X.21 WAN interface (half-height) ¹¹	4	
HSSI WAN interface ¹²	2	Do not install in slot 4; install in slot 3 or 1 if possible. If an SSL VPN Module 1000 is installed, you can install only one HSSI WAN interface card.

- 1 The VPN Router 2750 2750 must be running Version 5.0 or later.
- 2 The VPN Router 2750 2750 must be running Version 4.90 or later.
- 3 The VPN Router 2750 must be running Version 5.05.330, 6.05.140 and later, 7.00.062, 7.05.100 and later, or 7.05.300 and later.
- 4 The VPN Router 2750 2750 must be running Version 4.90 or later.
- 5 The VPN Router 2750 2750 must be running Version 4.90 or later.
- 6 The VPN Router 2750 2750 must be running Version 5.0 or later.
- 7 The VPN Router 2750 2750 must be running Version 4.90 or later.
- 8 The VPN Router 2750 2750 must be running Version 4.80 or later.
- 9 The VPN Router 2750 2750 must be running Version 4.90 or later.
- 10 The VPN Router 2750 2750 must be running Version 4.80 or later.
- 11 The VPN Router 2750 2750 must be running Version 4.80 or later.
- 12 The gateway must be running Version 4.76 or later, or the hardware revision must be at least 03.

[Table 17](#) provides additional guidelines for option card installation when an SSL VPN Module 1000 is installed in slot 1.

Table 17 Installing other option cards with the SSL VPN Module 1000

Option card	Restrictions with SSL VPN Module 1000 installed
VPN Router Security Accelerator	Only one VPN Router Security Accelerator card can be installed.
1000BASE-T or 1000BASE-SX interface	You can install two cards only if <i>none</i> of these cards is installed: <ul style="list-style-type: none"> • VPN Router Security Accelerator • HSSI If a VPN Router Security Accelerator or HSSI card is installed, only one 1000BASE-T or 1000BASE-SX card can be installed.
V.90 modem interface	Do not install this card in slot 2.
HSSI WAN interface	You can install only one HSSI card. Install this card in slot 3 if possible, and do not install this card in slot 4.

Installing and replacing an option card

To install or replace an interface card or the VPN Router Security Accelerator card:

- 1 Shut down the VPN Router 2750 using the Web GUI or the command line interface and then unplug it as described in [“Shutting down the system to add or replace hardware” on page 62](#).



Warning: Risk of electric shock

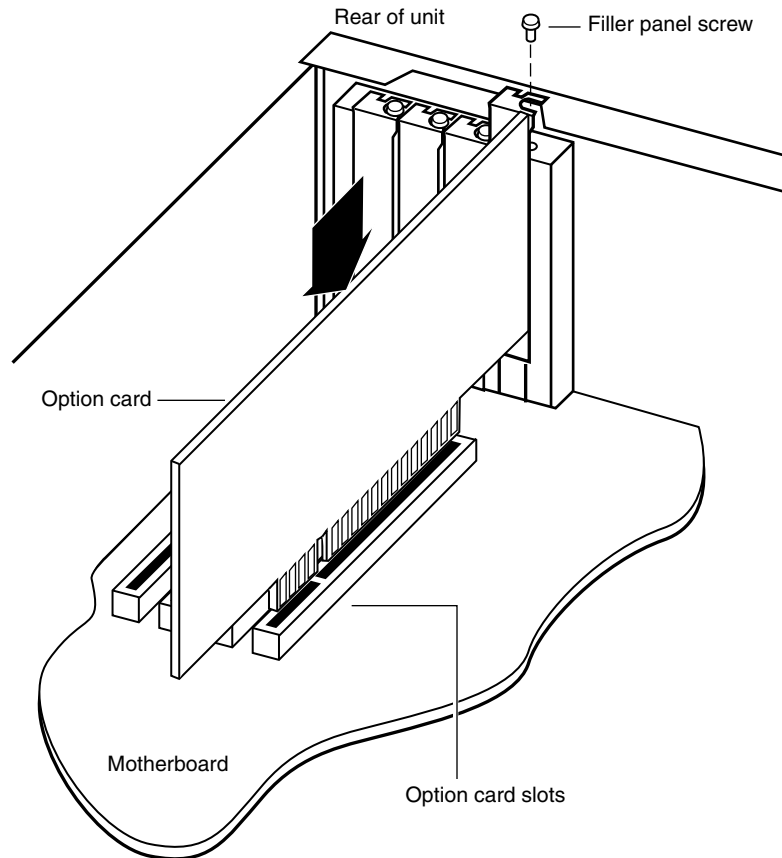
Turn off the VPN Router 2750 and unplug it before you attempt to install an option card.

- 2 Remove the front bezel from the chassis, and then remove the chassis from the equipment rack (see [“Removing the front bezel and top cover” on page 63](#)).
- 3 Remove the top cover from the chassis (see [“Removing the front bezel and top cover” on page 63](#)).
- 4 Attach the antistatic wrist strap that was shipped with the VPN Router 2750 (see [“Attaching the antistatic wrist strap” on page 67](#)).
- 5 Locate the slot where you plan to install the new or replacement option card.



Note: Do not try to install an HSSI WAN interface card or a VPN Router Security Accelerator card in slot 4.

- 6 Remove the filler panel screw.
- 7 Pull out the filler panel (or the option card that you are replacing) from the slot ([Figure 24](#)).

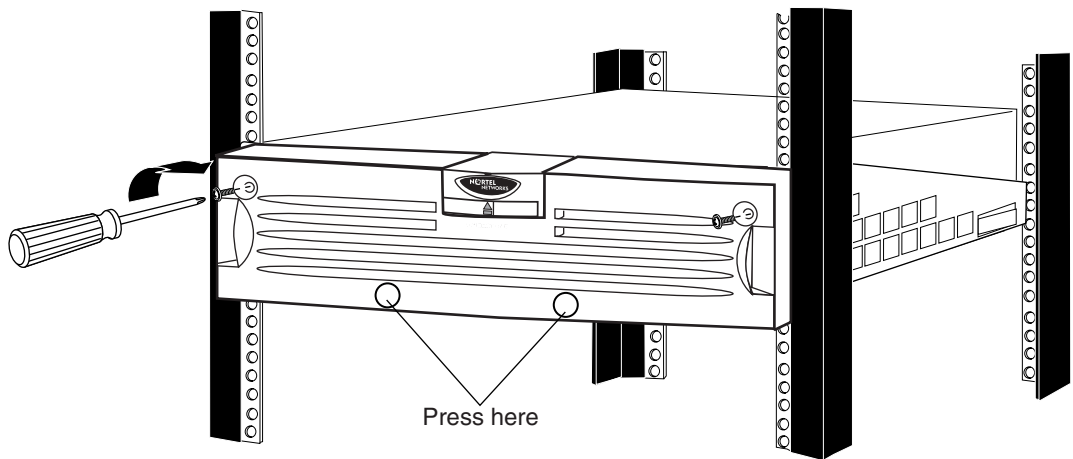
Figure 24 Installing and removing an option card

CS2600017A

- 8** Lower the new option card into the slot, and gently press the connector into the slot.
Seat the card firmly in the slot. If you do not properly seat the card, it does not work.
- 9** Replace the screw that secures the card to the slot ([Figure 24 on page 71](#)).
- 10** Replace the top cover on the chassis ([Figure 21 on page 65](#)).
 - a** Hold the cover at an angle, and slide it onto the chassis.
 - b** Insert the four screws that secure the cover to the chassis, and use a screwdriver to tighten the screws.
- 11** Do the following to install the VPN Router 2750 in an equipment rack:

- a** Set the VPN Router 2750 on the rack-mount shelf in the rack.
 - b** Insert one of the panhead screws through the bottom hole on each side of the shelf into the hole in the rack, and tighten the screws ([Figure 4 on page 31](#)).
- 12** Replace the front bezel ([Figure 25](#)).
 - a** Hold the bezel by the two handles, and push the bezel onto the chassis.
 - b** Use a screwdriver, to tighten the two screws that secure the bezel to the chassis.

Figure 25 Replacing the front bezel



CS260005E

Installing and replacing DIMMs

The VPN Router 2750 has two slots for dual inline memory modules (DIMM) ([Figure 22 on page 66](#)). Unless you ordered additional memory, the VPN Router 2750 is shipped with one 256 MB DIMM installed. You can upgrade memory in the gateway by installing a second 256 MB DIMM.

This section provides instructions on adding a second DIMM to the VPN Router 2750 or, if necessary, replacing an existing DIMM.



Caution: Use of a memory module not purchased from Nortel can render void your warranty or your service contract.



Caution: Ensure that you install the same type of DIMM that is already installed in your gateway.

To install or replace a DIMM:

- 1 Shut down the VPN Router 2750 using the Web GUI or the CLI, and then unplug it as described in [“Shutting down the system to add or replace hardware” on page 62](#).



Warning: Risk of electric shock

Turn off the VPN Router 2750 and unplug it before you attempt to install a DIMM.

- 2 Remove the front bezel from the chassis, and then remove the chassis from the equipment rack (see [“Removing the front bezel and top cover” on page 63](#)).
- 3 Remove the top cover from the chassis (see [“Removing the front bezel and top cover” on page 63](#)).
- 4 Attach the antistatic wrist strap that was shipped with the VPN Router 2750 (see [“Attaching the antistatic wrist strap” on page 67](#)).



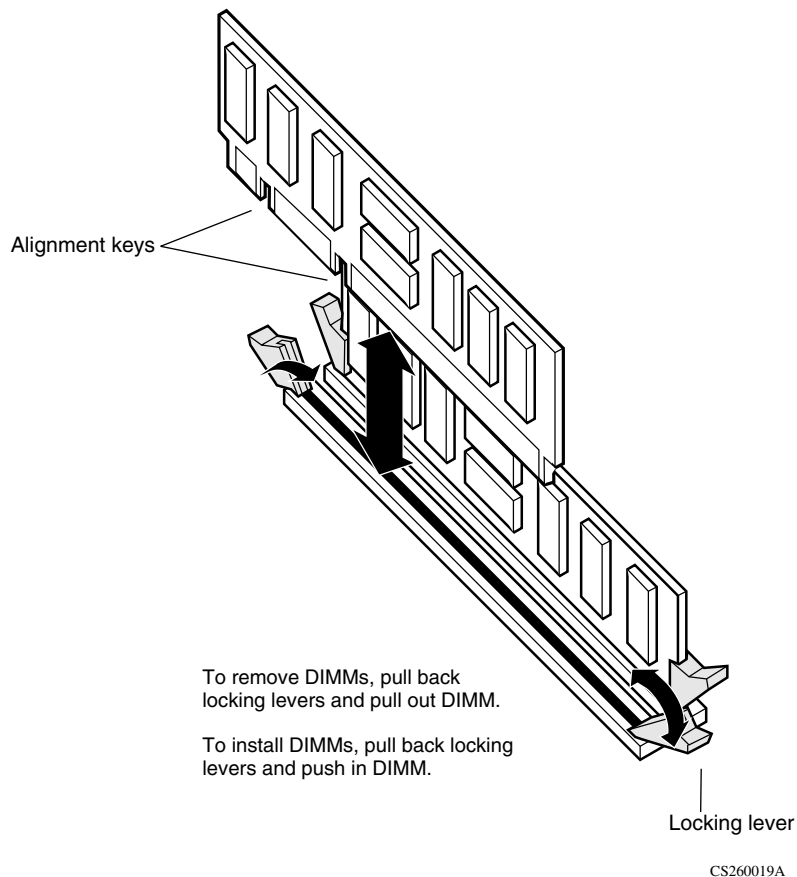
Caution: Risk of equipment damage

Electrostatic discharge can damage VPN Router 2750 components.

- 5 To replace a DIMM, remove the installed DIMM as follows:
 - a Press down the locking lever on either side of the DIMM (Figure 26).
 - b Pull the DIMM up to remove it from the slot.
- 6 Press down the locking lever on either side of the slot where you plan to install the new DIMM (Figure 26).
- 7 Place the new or replacement DIMM in the slot (Figure 26).

Use the alignment keys to properly position the DIMM in the slot.
- 8 Press the DIMM firmly into the socket.
- 9 Pull up the locking lever on either side of the DIMM to snap it into position.

Figure 26 Installing and removing a DIMM



- 10** Replace the top cover on the chassis ([Figure 21 on page 65](#)).
 - a** Hold the cover at an angle, and slide it onto the chassis.
 - b** Insert the four screws that secure the cover to the chassis, and use the screwdriver to tighten the screws.
- 11** To install the VPN Router 2750 in an equipment rack, do the following:
 - a** Set the VPN Router 2750 on the rack-mount shelf in the rack.
 - b** Insert one of the panhead screws through the bottom hole on each side of the shelf into the hole in the rack, and tighten the screws ([Figure 4 on page 31](#)).
- 12** Replace the front bezel ([Figure 25 on page 72](#)).
 - a** Hold the bezel by the two handles, and push the bezel onto the chassis.
 - b** Use the screwdriver to tighten the two screws that secure the bezel to the chassis.

Appendix A

Technical specifications

This appendix provides technical specifications for the VPN Router 2750 chassis and the chassis interfaces.

Chassis specifications

[Table 18](#) lists physical, electrical, and environmental specifications for the chassis.

Table 18 Physical, electrical, and environmental specifications

Specification	Description
Physical	
Height	5.25 in. (13.335 cm)
Width	17 in. (43.18 cm)
Depth	21 in. (53.34 cm)
Weight	28 lbs. (12.7 kg)
Electrical	
Voltage	100–240 VAC
Current	5 A @ 100 VAC or 3 A @ 240 VAC
Frequency	50–60 Hz
Environmental	
Operating temperature	32–104°F (0–40°C)
Storage temperature	-40–185°F (-40–85°C)
Operating humidity	10–90% noncondensing
Storage humidity	10–95% noncondensing

Table 18 Physical, electrical, and environmental specifications (continued)

Specification	Description
Operating altitude	8202 ft (2500 m) maximum
Storage altitude	40 000 ft (12 192 m) maximum

System ports

The VPN Router 2750 system board provides the following built-in interfaces:

- two 10/100BASE-TX Ethernet local area network (LAN) ports
- serial port

This section provides information about the 10/100BASE-TX Ethernet LAN ports and the serial port on the system board.

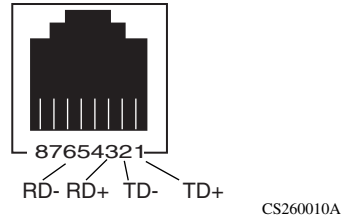
10/100BASE-TX Ethernet LAN ports

The system board provides two 10/100BASE-TX Ethernet LAN interfaces—LAN 0 and LAN 1—on the rear of the chassis. (The LAN 0 interface is used for Web management.) Both built-in LAN interfaces accommodate an RJ-45 straight-through cable. Depending on whether you use the interfaces for 10BASE-T or 100BASE-TX operation, select cables for the interfaces as follows:

- 100BASE-TX connections require Category 5 twisted-pair wire. The 100BASE-TX specification supports 100 Mb/s transmission over two pairs of Category 5 twisted-pair Ethernet wiring: one pair each for transmit and receive operations.

Nortel recommends a maximum length of 100 meters for the cable segment between a 100BASE-TX repeater and a workstation (due to signal timing requirements). This wiring scheme complies with the EIA 568 wiring standard.
- 10BASE-T connections can use Category 3, 4, or 5 twisted-pair wiring.

[Figure 27 on page 79](#) shows the 10/100BASE-X connector and the connector pinouts.

Figure 27 10/100BASE-TX Ethernet connector

[Table 19](#) provides the 10/100BASE-TX Ethernet port pinouts.

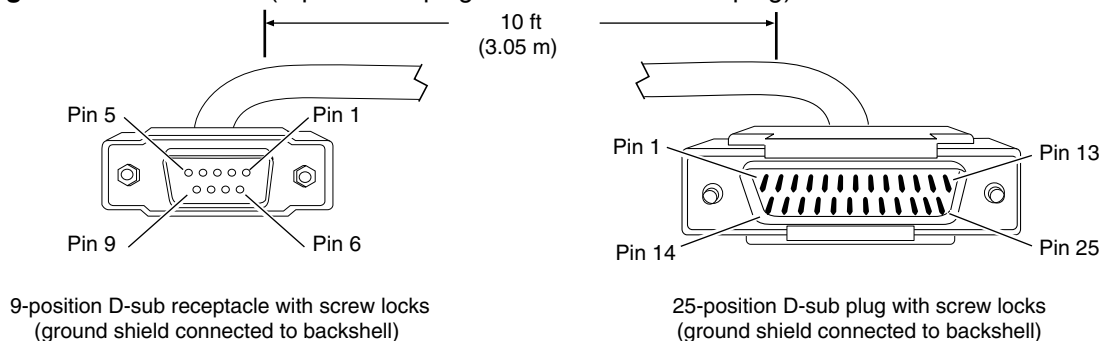
Table 19 10/100BASE-X Ethernet port pinouts

Pin	Description
1	TD +
2	TD -
3	RD +
6	RD -

Serial port

The system board provides a serial port on the rear of the chassis to enable out-of-band management. Use the serial port to assign the management IP address and subnet mask to the newly installed gateway (for more information, see [Chapter 3, “Configuring the management IP interface,” on page 53](#)).

The serial cable that Nortel supplies with the VPN Router 2750 is a DB9/DB25-to-DB9/DB25 cable. This cable provides a crossover connection (transmit-to-receive and receive-to-transmit). The DB9 connector goes into the gateway and the other DB9 or DB25 connector goes into your workstation ([Figure 28 on page 80](#)).

Figure 28 Serial cable (9-pin D-sub plug to RS-232-C modem plug)

CAB0056A

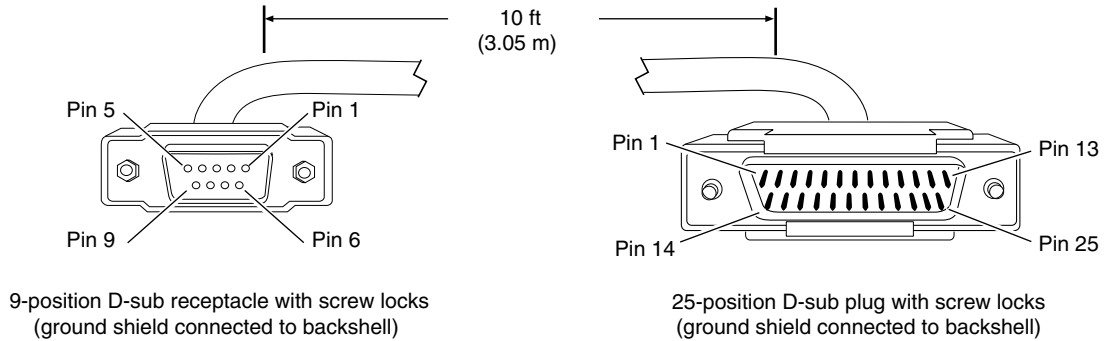
Table 20 provides the multiple DB9/DB25 serial interface cable pinouts.

Table 20 Multiple DB9 and DB25 connector pinouts

Serial port DB9 connector		Serial port DB25 connector			Serial port DB25 connector		Serial port DB9 connector	
Pinout	Signal	Pinout	Signal		Pinout	Signal	Pinout	Signal
2	RXD	3	TXD	>	2	RXD	3	TXD
3	TXD	2	RXD	>	3	TXD	2	RXD
4	DTR	20	DSR	>	6	DTR	6	DSR
5	Ground	7	Ground	>	7	Ground	5	Ground
6	DSR	6	DTR	>	20	DSR	4	DTR
7	RTS	4	RTS	>	5	CTS	8	CTS
8	CTS	5	CTS	>	4	RTS	7	RTS

Modem cable specifications

If you need to connect a modem to a VPN Router 2750, you must obtain an appropriate modem cable. The modem cable must have a 9-pin D-sub plug that connects to the VPN Router 2750 serial port and a 25-pin D-sub plug that connects to the RS-232-C modem port (Figure 29 on page 81).

Figure 29 Modem cable (9-pin D-sub plug to RS-232-C modem plug)

CAB0056A

[Table 21](#) provides the modem cable pinouts.

Table 21 Modem cable pinouts

Nortel termination		Modem termination	
Signal	Pin # to Pin #	Signal	
Data Carrier Detect	1 8	Data Carrier Detect	
Transmit Data (TXD)	2 2	Transmit Data (TXD)	
Receive Data (RXD)	3 3	Receive Data (RXD)	
Data Set Ready	4 6	Data Set Ready	
Data Terminal Ready	6 20	Data Terminal Ready	
Clear to Send	7 5	Clear to Send	
Request to Send	8 4	Request to Send	

Hardware option cards

The VPN Router 2750 provides four PCI slots that support a combination of the following option cards:

- VPN Router Security Accelerator card
- SSL VPN Module 1000
- 10/100BASE-TX Ethernet interface card
- 1000BASE-T (1000 GT) Ethernet interface card

- 1000BASE-T (1000 MT) Ethernet interface card
- 1000BASE-SX Ethernet interface card
- 56/64K CSU/DSU WAN interface card
- ADSL WAN interface card
- ISDN BRI interface card
- T1 CSU/DSU WAN interface card (full-height card)
- T1/E1 CSU/DSU WAN interface card (half-height card)
- Quad T1/E1 CSU/DSU WAN interface card
- V.90 modem interface card
- Single V.35/X.21 WAN interface card
- HSSI WAN interface card

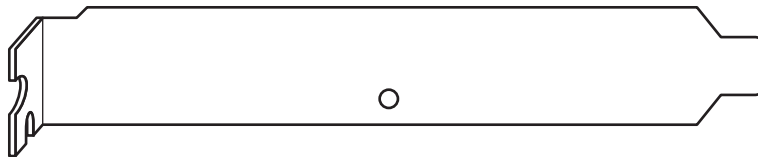
This section provides information about the option cards, including the connector and the cable pinouts for each supported network interface card. For more information about the restrictions on the option cards see [Table 16 on page 68](#).

VPN Router Security Accelerator

Nortel supports the VPN Router Security Accelerator option card that performs bulk encryption and compression algorithms for IPsec tunnel traffic.

[Figure 30](#) shows the VPN Router Security Accelerator card.

Figure 30 VPN Router Security Accelerator card



The VPN Router Security Accelerator card uses a single Hifn 7854 chip for encryption and compression and has 64 MB of onboard RAM. It supports Advanced Encryption Standard (AES)-128 cryptography with SHA-1 authentication and triple Data Encryption Standard (DES) cryptography with either Message Digest 5 Algorithm (MD5) or Secure Hash Algorithm (SHA)-1 authentication.

The VPN Router Security Accelerator card is the successor to the Hardware Accelerator card. The Hardware Accelerator Hifn 7811 card has been discontinued effective January 2006 although Nortel still supports this card. However, the VPN Router 2750 does not support the Hardware Accelerator card. Along with providing support for AES, the VPN Router Security Accelerator card provides increased encryption throughput and improved compression performance.



Note: The VPN Router Security Accelerator card has one green LED.

At startup, when you manually enable an accelerator card, or when the accelerator recovers from a failure, the power-on self-test (POST) verifies the integrity of the hardware. This test includes validation of the accelerator's encryption, MAC, and compression algorithms against their software counterparts. In the event POST fails, the accelerator card is set offline.

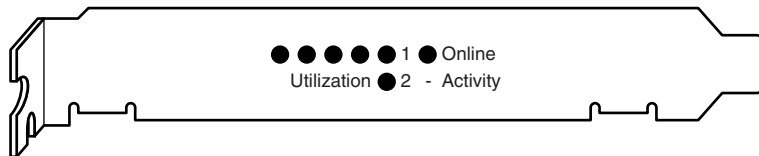
For more information about the VPN Router Security Accelerator card and instructions for configuring this card, see the guide *Nortel VPN Router Configuration — Advanced Features* (NN46110-502).

SSL VPN Module 1000

The SSL VPN Module 1000 provides complete SSL VPN processing capability to the VPN Router gateway. This module provides a unified solution for IPsec and remote access SSL VPN.

Figure 31 shows the SSL VPN Module 1000.

Figure 31 SSL VPN Module 1000



11356EA

The SSL VPN Module 1000 has no external access: all traffic to and from the SSL VPN Module 1000 card occurs over an internal high-speed link.

The SSL VPN Module 1000 is supported on VPN Router 5000, 2750, 2700, and 1750 gateways running VPN Router Version 5.0 software. You must install the SSL VPN Module 1000 in slot 1 of the VPN Router 5000, 2750, 2700, or 1750.

The VPN Router gateway distinguishes between the services that it provides and the services that the SSL VPN Module 1000 provides and immediately forwards the appropriate traffic to the SSL VPN module.



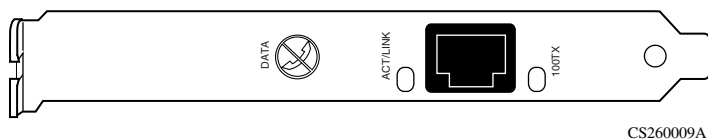
Note: For complete information about the SSL VPN Module 1000 and instructions for configuring it, see *Nortel VPN Router Configuration — SSL VPN Services* (NN46110-501).

10/100BASE-TX Ethernet interface card

The 10/100BASE-TX Ethernet interface card has a single RJ-45 connector that provides the signals needed to interface to 10BASE-T and 100BASE-TX Ethernet equipment.

[Figure 32](#) shows the 10/100BASE-TX Ethernet interface card.

Figure 32 10/100BASE-TX Ethernet interface card



For information about the cables that you can connect to this interface and the cable pinouts, see [“10/100BASE-TX Ethernet LAN ports” on page 78](#).

1000BASE-T (1000 GT) Ethernet interface card

The 1000BASE-T (1000 GT) Ethernet card replaces the 10/100BASE-TX Ethernet card (see the previous section). This card provides 10/100/1000 Mbit/s Ethernet services and supports autonegotiation. The card supports the IEEE 802.3ab standard and provides RJ-45/CAT 5 interconnection. It can operate in either full or half duplex mode at 10/100 Mbit/s, and in full duplex mode at 1 Gbit/s. At 1 Gbit/s, autonegotiation must be used.

The 1000BASE-T (1000 GT) Ethernet card supports 10/100/1000 Mbit/s operation in the VPN Router 2700/2750.

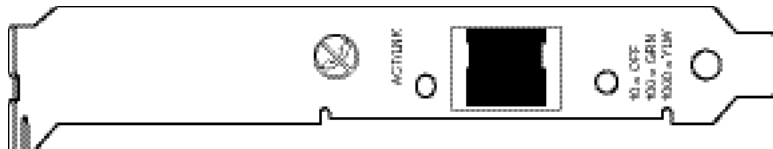
For the 1000BASE-T (1000 GT) Ethernet interface card to be recognized by the system, the minimum required VPN Router operating software is:

- 5.05.330
- 6.05.140 and all subsequent versions
- 7.00.062
- 7.05.100 and all subsequent versions (FIPS branch)
- 7.05.300 and all subsequent versions

The 1000 GT card does not replace the high-performance 1000BASE-T 1000 MT card (see the following section).

The following figure shows the 1000BASE-T (1000 GT) Ethernet interface full-height card for VPN Router.

Figure 33 1000BASE-T (1000 GT) Ethernet interface card (all models except VPN Router 2750 1100)

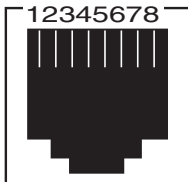


Select cables for this card as follows. Keep in mind that this card is auto-negotiating and uses the highest possible data rate:

- For 1000BASE-T operation, use Category 5 four-pair Ethernet wiring. The cable must comply with the TIA 568 wiring specification. Nortel recommends a maximum length of 100 meters for the cable segment.
- For 100BASE-TX operation, use Category 5 twisted-pair wiring: one pair each for transmit and receive operations. The cable must comply with the EIA 568 wiring specification. Nortel recommends a maximum length of 100 meters for the cable segment.
- For 10BASE-T operation, use Category 3, 4, or 5 twisted-pair wiring.

The following table provides the pinouts for the 1000BASE-T (1000 GT) Ethernet interface card..

Table 22 1000BASE-T (1000 GT) Ethernet pinouts

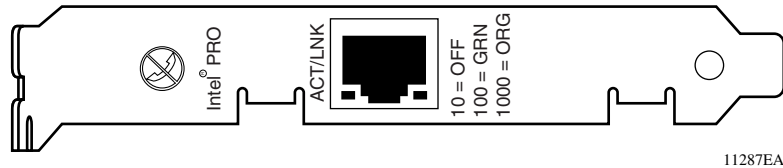
 CS260010A	Pin	Description
	1	TP0+
	2	TP0-
	3	TP1+
	4	TP2+
	5	TP2-
	6	TP1-
	7	TP3+
	8	TP3-

1000BASE-T (1000 MT) Ethernet interface card

Use the 1000BASE-T Ethernet interface card to connect to Gigabit Ethernet interfaces on other devices in your network, as well as to provide increased throughput. This interface card has a single RJ-45 connector.

Figure 34 shows the 1000BASE-T Ethernet interface card.

Figure 34 1000BASE-T (1000 MT) Ethernet interface card



The port on the 1000BASE-T Ethernet interface card accommodates an RJ-45 straight-through cable. Select cables for this port as follows:

- For 1000BASE-T operation, use Category 5 four-pair Ethernet wiring. The cable must comply with the TIA 568 wiring specification. Nortel recommends a maximum length of 100 meters for the cable segment.
- For 100BASE-TX operation, use Category 5 twisted-pair wiring: one pair each for transmit and receive operations. The cable must comply with the EIA 568 wiring specification. Nortel recommends a maximum length of 100 meters for the cable segment.
- For 10BASE-T operation, use Category 3, 4, or 5 twisted-pair wiring.

Table 23 provides the 1000BASE-T Ethernet port pinouts.

Table 23 1000BASE-T Ethernet port pinouts

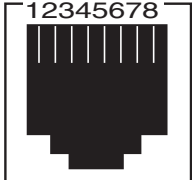
 CS260010A	Pin	Description
	1	TP0+
	2	TP0-
	3	TP1+
	4	TP2+
	5	TP2-
	6	TP1-

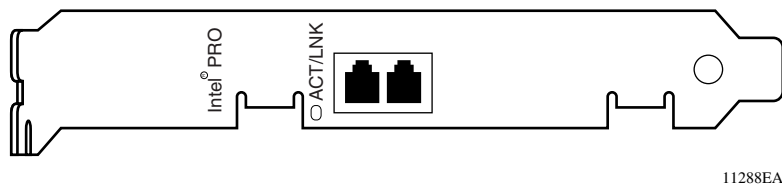
Table 23 1000BASE-T Ethernet port pinouts

	Pin	Description
	7	TP3+
	8	TP3-

1000BASE-SX Ethernet interface card

The 1000BASE-SX Ethernet interface card implements short-wavelength (850 nm) laser transmissions. Use this interface card to connect to fiber Gigabit Ethernet interfaces on other devices in your network, as well as to provide increased throughput. The 1000BASE-SX Ethernet interface card has a single type LC fiber connector.

Figure 35 shows the 1000BASE-SX Ethernet interface card.

Figure 35 1000BASE-SX Ethernet interface card

The port on the 1000BASE-SX Ethernet interface card accommodates a multimode fiber (MMF) cable that meets MMF standards. Select fiber cable for this interface as follows:

- 50-micron MMF cable: provides a distance range of 500–550 meters (m)
- 62.5-micron MMF cable: provides a distance range of 220–275 m

You can order a 10-foot MMF cable from Nortel:

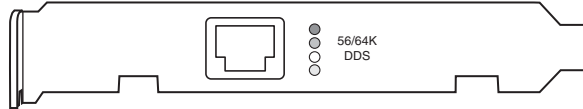
- Order no. DM0011117 provides an LC-to-LC connector
- Order no. DM0011118 provides an LC-to-SC connector

56/64K CSU/DSU WAN interface card

The 56/64K CSU/DSU WAN interface card has a single RJ-48 connector that provides the signals needed to interface to network equipment.

Figure 36 shows the 56/64K CSU/DSU WAN interface card.

Figure 36 56/64K CSU/DSU WAN interface card



The connector on the 56/64K CSU/DSU WAN interface card accommodates an 8-pin RJ-48 modular patch cord.



Note: Nortel does not supply an interface cable with the 56/64K CSU/DSU WAN interface card.

Use cable that is wired in accordance with ANSI T1.410 wiring style. This wiring style ensures that a twisted pair inside the patch cord carries the transmit signal (pins 1 and 2) and the receive signal (pins 7 and 8). Nortel strongly recommends that you use professionally manufactured patch cords.

You connect the 56/64K CSU/DSU WAN interface card to the service provider network using a straight-through cable or a crossover cable, depending on how the service provider wired its jack.

[Table 24](#) provides the 56/64K CSU/DSU cable pinouts for a crossover connection.

Table 24 56/64K CSU/DSU cable pinouts for crossover connection

Nortel termination		Remote termination	
Signal	Pin # to Pin #	Signal	
Transmit tip	1 7	Receive tip	
Transmit ring	2 8	Receive ring	
not used	3 3	not used	
not used	4 4	not used	
not used	5 5	not used	
not used	6 6	not used	
Receive tip	7 1	Transmit tip	
Receive ring	8 2	Transmit ring	

The cable operates properly if you do not connect pins 3, 4, 5, and 6.

[Table 25](#) provides the 56/64K CSU/DSU cable pinouts for a straight-through connection.

Table 25 56/64K CSU/DSU cable pinouts for straight-through connection

Nortel termination		Remote termination	
Signal	Pin # to Pin #	Signal	
Transmit tip	1 1	Transmit tip	
Transmit ring	2 2	Transmit ring	
not used	3 3	not used	
not used	4 4	not used	
not used	5 5	not used	
not used	6 6	not used	
Receive tip	7 7	Receive tip	
Receive ring	8 8	Receive ring	

ADSL WAN interface card

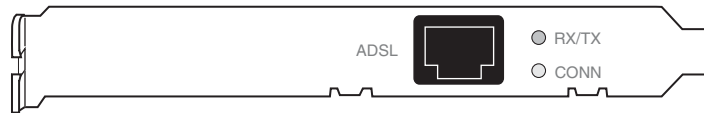
The ADSL Annex A and Annex B WAN interface cards have a single RJ-11 connector that provides the signals needed to interface to the ADSL-provisioned telephone line.

Figure 37 shows the ADSL WAN interface card.



Note: The ADSL Annex A and ADSL Annex B cards look identical.

Figure 37 ADSL WAN interface card



Included in the accessory box with the ADSL WAN interface card is a 7-foot cable to attach to the DSLAM.

- The Annex A cable is an RJ-11 to RJ-11 cable.
- The Annex B cable is an RJ-11 to RJ-45 cable.

Table 26 provides the pinouts for the ADSL Annex A cable.

Table 26 ADSL Annex A cable pinouts

Pin	Function
1	N/C
2	Tip
3	Ring
4	N/C

[Table 27](#) provides the pinouts for the ADSL Annex B cable.

Table 27 ADSL Annex B cable pinouts

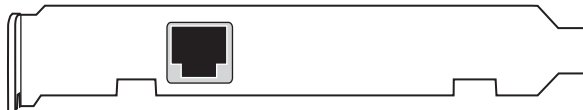
RJ-11 termination		RJ-45 termination	
Signal	Pin # to Pin #		Signal
N/C	1	6	N/C
Tip	2	5	Tip
Ring	3	4	Ring
N/C	4	3	N/C

ISDN BRI interface card

The ISDN BRI S/T and ISDN BRI U interface cards have a single RJ-45 connector that provides the signals needed to interface to ISDN equipment. (To connect the ISDN S/T interface to the ISDN network, you must attach an external NT-1 device to the RJ-45 connector.)

[Figure 38](#) shows the ISDN BRI S/T interface card or the ISDN BRI U interface card. The two look identical.

Figure 38 ISDN BRI S/T or IDSDN BRI U



The connector on the ISDN BRI S/T and ISDN BRI U interface cards accommodates an 8-pin RJ-45 modular patch cord. These cables are sold as Category 5, or Ethernet, cables.



Note: Nortel does not supply a cable with the ISDN BRI interface cards.

Table 28 provides the ISDN BRI S/T cable pinouts.

Table 28 ISDN BRI S/T cable pinouts

Pin	Function
1	N/C
2	N/C
3	Receive +
4	Transmit +
5	Transmit -
6	Receive -
7	N/C
8	N/C

Table 29 provides the ISDN BRI U cable pinouts.

Table 29 ISDN BRI U cable pinouts

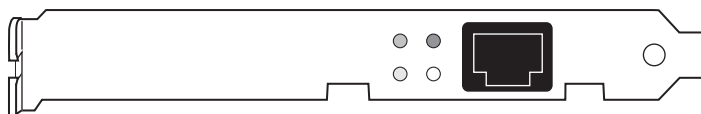
Pin	Function
1	N/C
2	N/C
3	N/C
4	U interface network connection (tip)
5	U interface network connection (ring)
6	N/C
7	N/C
8	N/C

T1/E1 CSU/DSU WAN interface card

The T1/E1 CSU/DSU WAN interface card has a single connector that provides the signals needed to interface to T1 or E1 equipment. This interface card ships as a half-height card and as a full-height card.

Figure 39 shows the T1/E1 CSU/DSU WAN interface card (half-height card).

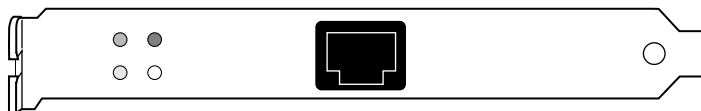
Figure 39 T1/E1 CSU/DSU WAN interface card (half-height card)



Note: For E1 service, you must install the half-height version of the T1/E1 CSU/DSU WAN interface card.

Figure 40 shows the T1/E1 CSU/DSU WAN interface card (full-height card).

Figure 40 T1/E1 CSU/DSU WAN interface card (full-height card)



CS160012A

The connector on the T1/E1 CSU/DSU WAN interface accommodates an 8-pin RJ-48 modular patch cord. These cables are commonly sold as Category 5, or Ethernet, cables.



Note: Nortel does not supply the T1/E1 CSU/DSU WAN interface cable with the WAN interface card.

Use cable that is wired in accordance with EIA-568-A wiring style. This wiring style ensures that a twisted pair inside the patch cord carries the transmit signal (pins 4 and 5) and the receive signal (pins 1 and 2). Nortel strongly recommends that you use professionally manufactured patch cords.

You connect the T1/E1 CSU/DSU WAN interface card to the service provider network using a straight-through cable or a crossover cable, depending on how the service provider wired its jack.

- For a straight-through connection, you can use a standard Category 5 (Ethernet) straight-through cable.
- For a crossover connection, you cannot use a standard Category 5 crossover cable. Do not interchange the T1/E1 CSU/DSU crossover cable and the Ethernet crossover cable.

[Table 30](#) provides the T1/E1 CSU/DSU cable pinouts for a crossover connection.

Table 30 T1/E1 CSU/DSU cable pinouts for crossover connection

Standard-wired end 8-pin male	Signal name	Pair number and conductor	Special-wired end 8-pin male
1	RXDA<-TXDA	wht/org pair 2A	5
2	RXDB<-TXDB	orange pair 2B	4
3	not used	wht/grn pair 3A	3
4	TXDB->RXDB	blue pair 1B	2
5	TXDA->RXDA	wht/blu pair 1A	1
6	not used	green pair 3B	6
7	not used	wht/brn pair 4A	7
8	not used	brown pair 4B	8

The cable operates properly if you do not connect pins 3, 6, 7, and 8.



Caution: For crossover connections, do not use Ethernet cable. If you use Ethernet cable, the T1/E1 CSU/DSU does not work to specifications, and this condition can corrupt data.

Table 31 provides the T1/E1 CSU/DSU cable pinouts for a straight-through connection.

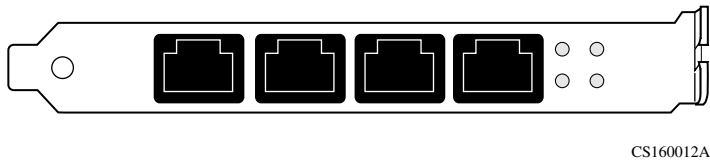
Table 31 T1/E1 CSU/DSU cable pinouts for straight-through connection

Nortel termination		Remote termination	
Signal	Pin # to Pin #		Signal
Receive A (RXDA)	1	1	Receive A (RXDA)
Receive B (RXDB)	2	2	Receive B (RXDB)
not used	3	3	not used
Transmit B (TXDB)	4	4	Transmit B (TXDB)
Transmit A (TXDA)	5	5	Transmit A (TXDA)
not used	6	6	not used
not used	7	7	not used
not used	8	8	not used


Quad T1/E1 CSU/DSU WAN interface card

The quad T1/E1 CSU/DSU WAN interface card has four connectors that provide the signals needed to interface to T1 or E1 equipment. Figure 41 shows the quad T1/E1 CSU/DSU WAN interface card.

Figure 41 Quad T1/E1 CSU/DSU WAN interface card



Each connector on the quad T1/E1 CSU/DSU WAN interface card accommodates an 8-pin RJ-48 modular patch cord. These cables are sold as Category 5, or Ethernet, cables.



Note: Nortel does not supply cables with the quad T1/E1 CSU/DSU interface card.

Use cable that is wired in accordance with EIA-568-A wiring style. This wiring style ensures that a twisted pair inside the patch cord carries the transmit signal (pins 4 and 5) and the receive signal (pins 1 and 2). Nortel strongly recommends that you use professionally manufactured patch cords.

You connect the quad T1/E1 CSU/DSU WAN interface card to the service provider network using a straight-through cable or a crossover cable, depending on how the service provider wired its jack.

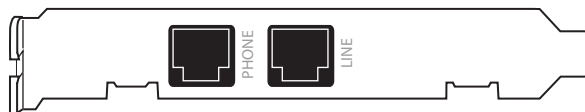
- For a straight-through connection, you can use a standard Category 5 (Ethernet) straight-through cable.
- For a crossover connection, you cannot use a standard Category 5 crossover cable. Do not interchange the T1/E1 CSU/DSU crossover cable and the Ethernet crossover cable.

For information about the cable pinouts for a crossover connection, see [Table 30 on page 95](#). For information about the cable pinouts for a straight-through connection, see [Table 31 on page 96](#).

V.90 modem interface card

The V.90 modem interface card has two RJ-11 connectors that provide the signals needed to interface to an incoming telephone line and to telephone equipment. [Figure 42](#) shows the V.90 modem interface card.

Figure 42 V.90 modem interface card



Included in the accessory box is a 7-foot RJ-11 cable to attach to a telephone jack.

Table 32 provides the V.90 modem port cable pinouts.

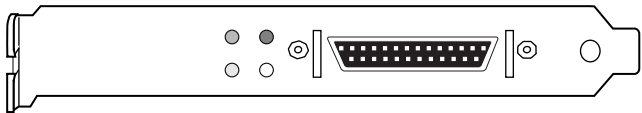
Table 32 V.90 modem cable pinouts

Pin	Function
1	N/C
2	Tip
3	Ring
4	N/C

Single V.35/X.21 WAN interface card

The single V.35/X.21 WAN interface card has a single DB28S connector that provides the signals needed to interface to V.35 and X.21 equipment. [Figure 43 on page 98](#) shows the single V.35/X.21 WAN interface card.

Figure 43 Single V.35/X.21 WAN interface card



CS160011A

You need a DSU/CSU (digital service unit/channel service unit) between the WAN connection and the gateway. You can order a V.35 or X.21 cable to attach to the connector. With this cable, the WAN adapter can function as DTE (data terminal equipment).

[Table 33](#) provides the V.35 cable pinouts. [Table 34 on page 100](#) provides the X.21 cable pinouts. (The pair suffix A or B refers to an individual wire within a twisted pair.)

Table 33 V.35 cable pinouts

Standard-wired end 28-pin male	Signal name	Pair number and conductor	Special-wired end 34-pin male	Notes
2	TXDA	pair 1A	P	
14	TXDB	pair 1B	S	

Table 33 V.35 cable pinouts (continued)

Standard-wired end 28-pin male	Signal name	Pair number and conductor	Special-wired end 34-pin male	Notes
3	RXDA	pair 2A	R	
16	RXDB	pair 2B	T	
15	TXCA	pair 3A	Y	
12	TXCB	pair 3B	AA	
17	RXCA	pair 4A	V	
9	RXCB	pair 4B	X	
24	SCTEA	pair 5A	U	
11	SCTEB	pair 5B	W	
4	RTSA	pair 6A	C	
19	RTSB	pair 6B	no conn	Note 1
5	CTSA	pair 7A	D	
13	CTSB	pair 7B	no conn	Note 1
6	DSRA	pair 8A	E	
22	DSRB	pair 8B	J	
20	DTRA	pair 9A	H	
23	DTRB	pair 9B	no conn	Note 1
8	DCDA	pair 10A	F	
10	DCDB	pair 10B	no conn	Note 1
18	LL	pair 11A	L	
21	RL	pair 11B	N	
25	TM	pair 12A	NN	
26	M0<-SIGNAL GROUND	pair 12B	B	Note 2
27	M1<-SIGNAL GROUND	pair 13A	B	Note 2
28	M2	pair 13B	no conn	Note 1
1	SHIELD	pair 14A	A	Notes 3,4
7	SIGNAL GROUND	pair 14B	B	Notes 2,4

The following notes apply to the single V.35 DTE cable:

1. The term "no conn" means the wire is not connected to a pin in the 34-pin connector.
2. Wires 12B, 13A, and 14B connect to pin B in the 34-pin connector.

3. At each end, the cable shield and connector shell must connect respectively to pin A of the 34-pin connector and pin 1 of the standard 28-pin connector.
4. Do not connect Shield to Signal Ground because these are separate signals.

[Table 34](#) provides the X.21 cable pinouts. (The pair suffix A or B refers to an individual wire within a twisted pair.)

Table 34 X.21 cable pinouts

Standard-wired end 28-pin male	Signal name	Pair number and conductor	Standard-wired end 15-pin male	Notes
2	TXDA	pair 1A	2	
14	TXDB	pair 1B	9	
3	RXDA	pair 2A	4	
16	RXDB	pair 2B	11	
15	TXCA	pair 3A	6	
12	TXCB	pair 3B	13	
17	RXCA	pair 4A	pair 5A	Note 1
9	RXCB	pair 4B	pair 5B	Note 1
24	SCTEA	pair 5A	pair 4A	Note 1
11	SCTEB	pair 5B	pair 4B	Note 1
4	RTSA	pair 6A	3	
19	RTSB	pair 6B	10	
5	CTSA	pair 7A	5	
13	CTSB	pair 7B	12	
6	DSRA	pair 8A	no conn	Note 2
22	DSRB	pair 8B	no conn	Note 2
20	DTRA	pair 9A	no conn	Note 2
23	DTRB	pair 9B	no conn	Note 2
8	DCDA	pair 10A	no conn	Note 2
10	DCDB	pair 10B	no conn	Note 2
18	LL	pair 11A	no conn	Note 2
21	RL	pair 11B	no conn	Note 2
25	TM	pair 12A	no conn	Note 2
26	M0	pair 12B	no conn	Note 2
27	M1	pair 13A	no conn	Note 2

Table 34 X.21 cable pinouts (continued)

Standard-wired end 28-pin male	Signal name	Pair number and conductor	Standard-wired end 15-pin male	Notes
28	M2<-SIGNAL GROUND	pair 13B	8	Note 3
1	SHIELD	pair 14A	1	Note 4,5
7	SIGNAL GROUND	pair 14B	8	Note 3,5

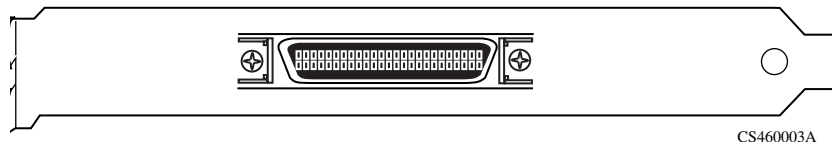
The following notes apply to the single X.21 cable:

1. Wires of pair 4 connect to wires of pair 5, but not to any pins in the DA-15.
2. The term "no conn" means the wire is not connected to a pin in the 15-pin connector.
3. Wires 13B and 14B connect to pin 8 in the 15-pin connector.
4. At each end, the cable shield and connector shell must connect to pin 1 of the connector.
5. Do not interconnect Shield to Signal Ground because these are separate signals.

HSSI WAN interface card

The HSSI WAN interface card has a 50-pin SCSI II female connector that provides the signals needed to interface to a T3 modem or modem eliminator.

[Figure 44](#) shows the HSSI WAN interface card.

Figure 44 HSSI WAN interface card

Included in the accessory box is a cable that maps the T3 signals out to a 50-pin SCSI II male connector.

[Table 35](#) provides the T3 cable pinouts.

Table 35 T3 cable pinouts

50-pin SCSI male	Signal name	50-pin SCSI male
1	GND	1
2	RCB	2
3	CAB	3

Table 35 T3 cable pinouts (continued)

50-pin SCSI male	Signal name	50-pin SCSI male
4	RDB	4
5	LCB	5
6	STB	6
7	GND	7
8	TAB	8
9	TTB	9
10	LAB	10
11	TDB	11
12	LBB	12
13	GND	13
19	GND	19
24	TESTB	24
25	GND	25
26	GND	26
27	RCA	27
28	CAA	28
29	RDA	29
30	LCA	30
31	STA	31
32	GND	32
33	TAA	33
34	TTA	34
35	LAA	35
36	TDA	36
37	LBA	37
38	GND	38
44	GND	44
49	TESTA	49
50	GND	50

Index

Numerics

- 10/100BASE-TX Ethernet interface card 84
 - cable specifications 78
 - connector 78
 - described 84
 - LEDs 42
- 10/100BASE-TX system LAN ports
 - cable specifications 78
 - connector 78
 - LEDs 41
- 1000BASE-SX Ethernet interface card
 - cable specifications 88
 - connector 88
 - described 88
 - LEDs 44
- 1000BASE-T (1000 GT) Ethernet interface card 85
 - LEDs 43
- 1000BASE-T (1000 MT) Ethernet interface card
 - LEDs 43
- 1000BASE-T Ethernet interface card
 - cable specifications 87
 - connector 87
 - described 87
- 56/64K CSU/DSU WAN interface card
 - cable pinouts 90, 92
 - connector 89
 - described 89
 - LEDs 46

A

- AC power cord
 - connecting 38
 - ordering 27

requirements 38

accessories, hardware, shipped with the gateway 27

acronyms 22

ADSL WAN interface card

cable pinouts, Annex A 91

cable pinouts, Annex B 92

connector 91

described 91

LEDs 47

antistatic wrist strap, attaching 67

B

bezel, front

removing 32, 63

replacing 33, 72

browsers, supported 59

C

cables

available from Nortel 36

connecting to the gateway 37

ordering 36

power. *See* AC power cord

technical specifications

1000BASE-SX connector 88

1000BASE-T connector 87

100BASE-TX connector 78

10BASE-T connector 78

56/64K CSU/DSU WAN interface 89

ADSL WAN interface 91

HSSI WAN interface 101

ISDN BRI interface 92

modem 81

- quad T1/E1 CSU/DSU WAN interface 97
- serial interface 79
- single V.35/X.21 WAN interface 98
- T1/E1 CSU/DSU WAN interface 94
- V.90 modem interface 97
- cables, technical specifications
 - 1000BASE-T connector 86
- cage nuts, when used 28
- Category 5 wiring requirements 78, 86, 87
- chassis
 - installing 29
 - removing
 - front bezel 32, 63
 - top cover 64
 - replacing
 - front bezel 33, 72
 - top cover 71
 - specifications 77
- configuring the management IP address 55
- connecting
 - cables 37
 - power cord 38
 - serial cable to the gateway 55
 - to the gateway using a browser 59
- connectors
 - 10/100BASE-TX Ethernet interface 84
 - 10/100BASE-TX system LAN port 78
 - 1000BASE-SX Ethernet interface 88
 - 1000BASE-T Ethernet interface 87
 - 56/64K CSU/DSU WAN interface 89
 - ADSL WAN interface 91
 - HSSI WAN interface 101
 - ISDN BRI S/T interface 92
 - quad T1/E1 CSU/DSU WAN interface 96
 - single V.35/X.21 WAN interface 98
 - T1/E1 CSU/DSU WAN interface 94
 - V.90 modem interface 97
- conventions, text 22
- cover, top
 - removing 64
 - replacing 71

D

- default gateway, defined 54
- DIMMs (dual inline memory modules), installing 72

E

- electrical specifications 77
- environmental specifications 77
- equipment rack, specifications 28
- Ethernet interface cards
 - specifications
 - 10/100BASE-TX 84
 - 1000BASE-SX 88
 - 1000BASE-T 87
- Ethernet system ports
 - cable specifications 78
 - connector 78
 - LEDs 41

F

- field replaceable units (FRU), installing 61
- front bezel
 - removing 32, 63
 - replacing 33, 72
- front panel LEDs 40

G

- gateway, default, defined 54
- Gigabit Ethernet interface cards
 - specifications
 - 1000BASE-SX 88
 - 1000BASE-T 87
- GUI, Web-based 59

H

- hardware accessories shipped with the gateway 27
- hardware option cards

specifications 81
See also VPN Router Security Accelerator card,
 Ethernet interface cards, Hardware
 Accelerator card, serial interface cards, SSL
 VPN Module card, WAN interface cards

help

by phone 18
 latest Web updates 17
 Nortel Web site 17
 through Nortel distributor 18, 19
 using Express Routing Code 18

help, How to get 17

HSSI WAN interface card

cable pinouts 101
 connector 101

I

installing DIMMs 72

installing the chassis

in an equipment rack 30
 on a flat surface 29
 prerequisites 26

interfaces, option card, technical specifications 81

interfaces, system, technical specifications 78

Internet Explorer, supported versions 59

IP address for managing the gateway. *See*
 management IP address

ISDN BRI S/T interface card

cable pinouts 93
 connector 92

ISDN BRI U interface card

cable pinouts 93

L

LAN interface cards

LEDs

10/100BASE Ethernet 42
 1000BASE-SX Ethernet 44
 1000BASE-T (1000 GT) Ethernet 43
 1000BASE-T (1000 MT) Ethernet 43

specifications

10/100-TXBASE 84
 1000BASE-SX 88
 1000BASE-T 87

LAN ports, system

cable specifications 78
 connector 78
 LEDs 41

LEDs

10/100BASE-TX Ethernet interface card 42
 1000BASE-SX Ethernet interface card 44
 1000BASE-T (1000 GT) Ethernet interface card
 43
 1000BASE-T (1000 MT) Ethernet interface card
 43
 56/64K CSU/DSU WAN interface card 46
 ADSL WAN interface card 47
 front panel 40
 quad T1/E1 CSU/DSU WAN interface card 49
 single V.35/X.21 WAN interface card 50
 SSL VPN Module 1000 51
 system LAN port 41
 T1/E1 CSU/DSU WAN interface card 48
 used to verify correct installation 39

M

main menu, serial interface 56

management IP address

configuring 55
 defined 54
 troubleshooting configuration of 60
 verifying 59

mask, subnet, defined 54

memory modules, adding and replacing 72

modem cable pinouts 81

N

Netscape Navigator, supported versions 59

NT-1 device, required for ISDN BRI S/T 92

O

- option cards
 - specifications 81
 - See also* VPN Router Security Accelerator card (CSA), Ethernet interface cards, Hardware Accelerator card, serial interface cards, SSL VPN Module card, WAN interface cards
- option cards, installing
 - VPN Router 2750 68

P

- physical specifications 77
- pinouts
 - 10/100BASE-TX Ethernet connector 78
 - 1000BASE-SX Ethernet interface 88
 - 1000BASE-T Ethernet interface 87
 - 56/64K CSU/DSU WAN interface 90, 92
 - ADSL WAN interface, Annex A 91
 - ADSL WAN interface, Annex B 92
 - HSSI WAN interface 101
 - ISDN BRI S/T interface 93
 - ISDN BRI U interface 93
 - modem cable 81
 - quad T1/E1 CSU/DSU WAN interface 95
 - serial interface cable 79
 - single V.35 WAN interface 98
 - single X.21 WAN interface 100
 - T1/E1 CSU/DSU WAN interface 95
 - V.90 modem interface 98
- plug, AC power, specifications 38
- power cord
 - connecting 38
 - ordering 27
 - requirements 38
- powering down the gateway 62
- processor cards, *See* VPN Router Security Accelerator card, Hardware Accelerator card, SSL VPN Module 1000
- publications
 - hard copy 24
 - related 23

Q

- quad T1/E1 CSU/DSU WAN interface card
 - cable pinouts 95
 - connector 96
 - described 96
 - LEDs 49

R

- rack, equipment, specifications 28
- rack-mount considerations 30
- rack-mount shelf 30
- requirements, site 28
- RJ-45, pinouts 78, 87

S

- serial cable, connecting to the gateway 55
- serial interface
 - cable pinouts 79
 - described 79
 - using to configure the management IP address 55
- serial interface cards
 - specifications
 - ISDN BRI 92
 - V.90 modem 97
- serial main menu 56
- shelf for rack-mount installation 30
- shipment contents 27
- shutting down the gateway 62
- single V.35/X.21 WAN interface card
 - connector 98
 - LEDs 50
 - V.35 pinouts 98
 - X.21 pinouts 100
- site requirements 28
- specifications
 - chassis 77
 - equipment rack 28
 - option cards 81

- serial port 79
- system ports 78
- SSL VPN Module 1000
 - described 83
 - LEDs 51
- subnet mask, defined 54
- system LAN ports
 - cable specifications 78
 - connector 78
 - LEDs 41
- system ports, specifications 78

T

- T1/E1 CSU/DSU WAN interface card
 - cable pinouts 95
 - connector 94
 - LEDs 48
- T3 HSSI WAN interface card. *See* HSSI WAN interface card
- technical publications 24
- technical specifications 77
- testing connectivity to the gateway 59
- text conventions 22
- top cover
 - removing 64
 - replacing 71
- troubleshooting the management IP address 60
- turning off the gateway 62

U

- user interface, Web 59

V

- V.35 WAN interface card. *See* dual V.35 WAN interface card
- V.35/X.21 WAN interface card. *See* single V.35/X.21 WAN interface card
- V.90 modem interface card

- cable pinouts 98
- connectors 97
- verifying a successful installation 39
- verifying the management IP interface 59
- VPN Router 2750
 - configuring management IP address for 53
 - connecting cables to 35
 - connecting power cord 38
 - description 25
 - installing option cards and DIMMs 61
 - option cards
 - installing 68
 - supported in VPN Router 2750 68
 - shipment contents 27
 - technical specifications 77
 - verifying a successful installation 39
 - verifying connectivity 59
- VPN Router 2750
 - installing the chassis 29
 - shutting down 62

W

- WAN interface cards
 - LEDs
 - 56/64K CSU/DSU 46
 - ADSL 47
 - quad T1/E1 CSU/DSU 49
 - single V.35/X.21 50
 - T1/E1 CSU/DSU 48
 - specifications
 - 56/64K CSU/DSU 89
 - ADSL 91
 - HSSI 101
 - quad T1/E1 CSU/DSU 96
 - single V.35/X.21 98
 - T1/E1 CSU/DSU 94
- Web interface to the gateway 59
- wiring requirements, Category 5 78, 86, 87
- wrist strap, antistatic, attaching 67

X

[X.21 WAN interface card](#). *See* [single V.35/X.21 WAN interface card](#)